BIENNIAL REPORT

OF THE

BOARD OF HORTICULTURE

OF THE

STATE OF OREGON

1909 - 10

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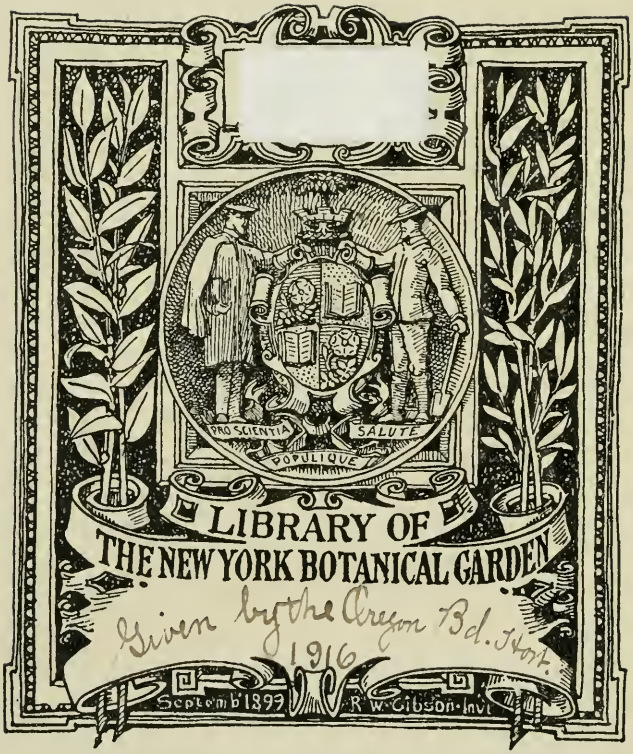
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ELEVENTH BIENNIAL REPORT

OF THE

Board of Horticulture

TO THE

TWENTY-SIXTH
LEGISLATIVE ASSEMBLY
REGULAR SESSION

OF THE

STATE OF OREGON

1911

SALEM, OREGON
WILLIS S. DUNIWAY, STATE PRINTER
1911

Walnut Grove, Willamette Valley.

LETTER OF TRANSMITTAL.

GASTON, OREGON, January 1, 1911.

To the Honorable the Legislative Assembly of the State of Oregon:

GENTLEMEN: In conformity with the statute which directs the Board of Horticulture to report biennially to you, I herewith submit my report of the work of the board for the years 1909 and 1910.

The board as now organized consists of five members for the five horticultural districts of the State, a commissioner at large and a secretary, and is supplemented by a county fruit inspector for each of the prominent fruit-growing counties. It is the duty of the district commissioners to look after the enforcement of the horticultural laws in their respective districts, to train and supervise their county inspectors, to gather information and statistics, and to attend to inspection of nurseries. The law requires that the commissioner at large, who is *ex-officio* president of the board shall visit all the principal fruit growing sections of the State at least once each year, and the fruit shipping centers during the shipping season, and that he shall at all times meet and address as many fruit growers' meetings and associations as possible.

The efficiency of the inspection work has been greatly increased during the past two years as evidenced by the improved condition of the orchards in general, and especially by the vastly better grade of fruit to be found on the markets. But considerable difficulty has been experienced by the commissioners in securing and retaining the services of competent county inspectors owing to the small remuneration connected with the office.

I would respectfully call your attention to my report of April, 1910, to the board, regarding the "Lafean Bill." This is a matter of federal legislation which came before the last Congress, that is highly inimical to the interests of the fruit growers of this State as it would require great changes in the size and shapes of our apple boxes as well as the methods of packing, grading, and labeling. We feel that we cannot submit to such legislation but it was only by great effort that it was defeated at the last session of Congress, and in all

probability it will come up again at the coming session. It is perhaps desirable that there shall be some federal regulation, but it must be such as shall not discriminate against any section, nor hamper the free movement of fruits to the markets, and all sections must be consulted in framing such legislation.

In this connection we desire a slight change in the wording of the act appropriating funds for the work of the board. The act at present does not specificially provide for the payment of expenses of a member in travelling outside of the State when such is necessary. As in the case of the Lafean Bill there are times when it is vitally necessary that some member of the board be able to attend sessions of Congress or other meetings outside of the State. The present appropriation is sufficient for the work of the board for the coming two years and we respectfully ask that it be left at the same figure.

You will observe from the following reports that the fruit output of the State has doubled in the last two years reaching, this year, the handsome sum of $6,612,000. The appended semi-annual reports of the commissioners and secretary show in detail the work that has been accomplished and how the funds have been expended, and I respectfully call your attention to them for further details.

Respectfully submitted,

W. K. NEWELL,
Commissioner at Large and President of the Board.

OFFICERS OF THE BOARD.

W. K. NEWELL - - - - - - - - - - - - - - PRESIDENT
R. H. WEBER - - - - - - - - - - - - - - - TREASURER
H. M. WILLIAMSON - - - - - - - - - - - - SECRETARY

OFFICE: PORTLAND, OREGON.

BOARD OF COMMISSIONERS

STATE AT LARGE

W. K. NEWELL - - - - - - - - - - - - - - GASTON

FIRST DISTRICT

M. O. LOWNSDALE - - - - - - - - - - - - PORTLAND

SECOND DISTRICT

CHAS. A. PARK - - - - - - - - - - - - - - SALEM

THIRD DISTRICT

A. H. CARSON - - - - - - - - - - - - - - GRANTS PASS

FOURTH DISTRICT

R. H. WEBER - - - - - - - - - - - - - - THE DALLES

FIFTH DISTRICT

JUDD GEER - - - - - - - - - - - - - - - COVE

DISTRICT BOUNDARIES

FIRST DISTRICT

Multnomah, Clackamas, Yamhill, Washington, Columbia, Clatsop and Tillamook Counties.

SECOND DISTRICT

Lincoln, Marion, Polk, Benton, Linn, and Lane Counties.

THIRD DISTRICT

Douglas, Jackson, Klamath, Josephine, Coos, Curry, and Lake Counties.

FOURTH DISTRICT

Morrow, Wasco, Gilliam, Hood River, Crook, Sherman, and Wheeler Counties.

FIFTH DISTRICT

Umatilla, Union, Baker, Wallowa, Malheur, Grant, and Harney Counties.

COUNTY FRUIT INSPECTORS

Baker—
Benton—
Clackamas—A. J. Lewis, R. F. D. No. 3, Oregon City.
Clatsop—C. S. Dow, Astoria.
Columbia—S. J. Pomeroy, Scappoose.
Coos—P. M. Hall-Lewis, Marshfield.
Crook—
Curry—
Douglas—F. A. McCall, Roseburg.
Gilliam—T. C. Mobley, Olex.
Grant—
Harney—Hugh Harris, Burns.
Hood River—G. R. Castner, Hood River.
Jackson—J. W. Myers, Central Point; Assistants: J. G. Medley, Medford; Clyde Barnum, Phoenix; T. F. Smith, Ashland.
Josephine—J. F. Burke, Grants Pass.
Klamath—O. A. Stearns, Klamath Falls.
Lake—A. M. Smith, New Pine.
Lane—J. Beebe, Eugene.
Linn—D. W. Rumbaugh, Albany.
Lincoln—S. G. Irwin, Newport.
Malheur—E. B. Conklin, Ontario.
Morrow—
Marion—E. C. Armstrong, Salem.
Multnomah—J. E. Stansbery, 582 Windsor St., Portland.
Polk—Ross Nelson, Independence.
Sherman—A. P. Altermatt, Rufus.
Tillamook—
Umatilla—S. J. Campbell, Freewater.
Union— Stillwell, La Grande.
Wallowa—Ford C. Potter, Wallowa.
Wasco—J. P. Carroll, Mosier.
Washington—S. J. Galloway, Hillsboro.
Wheeler—
Yamhill—

Yellow Newtown Apple Tree. Hoover Orchard, Medford, Oregon.

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REPORTS OF W. K. NEWELL.

President of Board and Commissioner at Large.

APRIL MEETING, 1909.

GASTON, OREGON, April 15, 1909.

To the Honorable State Board of Horticulture:

I trust that the reports that you will submit today contain a record of activity in horticultural field work during the past season and are full of encouragement for the coming one.

At this early date it is almost impossible to make any close estimate as to the coming crop; at best only the conditions to date can be recorded. As far as my personal observation over the greater part of Western and Northern Oregon is concerned, I find things quite encouraging.

It is a great satisfaction to ride along and see almost every orchard or home garden lot of trees all nicely sprayed and the neglected, unsprayed tree the exception, instead of as formerly *vice versa*. Our county inspectors are rapidly bringing the delinquents into line and soon it will be the universal rule to give every tree at least one good pruning and spraying annually. Once that is accomplished and the good results seen, further necessary care will be freely given.

Eastern Oregon and the northern part of the Willamette Valley experienced this year the coldest winter recorded in many years, and as a result there has probably been some damage done to the more tender fruits, such as peaches and loganberries. It is impossible to tell how extensive the injury has been as yet, but there is certainly no reason to fear any famine in these lines.

This matter of preparing reports of crop prospects is a difficult one but one of great importance, and I trust you will use all care to be just as accurate as possible; erring, if at all, always on the side of conservatism. A light crop rarely ever proves so nearly a failure as is at first feared, nor does a bumper crop ever turn out quite so big as anticipated.

Reports of either extreme condition may do a great deal of harm to the parties most directly concerned. I believe that reports of very large yields of apples last year cost the growers a good deal of money; parties that were well informed knew that the average crop was light, yet persistent boom reports from certain sections gave the impression that the crop was phenomenally large.

DEC 14 1910

I trust that we can today formulate some plan whereby our inspectors can make some accurate reports of conditions as they exist in their respective counties.

The tenth biennial report of the board is just now coming from the press; I am very sorry that it has been so long delayed, as it should have been printed earlier. In spite of our best efforts it seemed impossible to get the material ready for the State Printer soon enough for him to get it printed before the legislature met, hence we had to wait until that work was out of the way. I do not know as there was any one to blame, and the only remedy I see is for us to be a little earlier next time and then demand precedence.

In preparing this report the aim has been to condense matters a great deal in comparison with former reports; to cut out all filling and all matter not directly applicable to our own conditions. Although far short of what I had hoped to have it, I trust that it will be found of some benefit to our growers. We have a generous allowance of them this time, having been granted a 50 per cent increase in the number printed.

There is need for extreme vigilance in the matter of the inspection of incoming nursery stocks, seedlings as well as other stock. There is such an amount of planting now being done in the State that our local supplies of trees are totally inadequate and a vast amount of importing is now being done.

As there are no regions where trees are now grown in any quantity that are free from pests, we are in grave danger from these importations. I feel that a word should be said here in appreciation of the careful work done by Inspector E. C. Armstrong of Marion County in detecting the presence of the justly dreaded brown-tail moth in a shipment of nursery stock coming from France. He had never seen them before but recognized them from the cuts and descriptions that he had been studying.

The alarm was immediately sounded and other shipments from the same source were traced and thoroughly examined, with the result that Oregon has been spared this scourge for the time at least.

The matter of national legislation regarding the size of apple boxes, the grading of fruit, and the marking of the packages is going to demand our attention the coming regular session of congress. The Porter bill has been laid aside and another measure but little less objectionable has been substituted and labeled a compromise measure, to which all the interested parties are supposed to have agreed.

This bill has been introduced by Representative Lafean of Pennsylvania, and I understand will be pushed vigorously next winter. We should bring the matter to the attention of our

fruit growers' societies and try to agree on the changes that we wish made in this bill. Some kind of a measure we must submit to, it seems, but we cannot allow the size of our box to be increased arbitrarily some ten per cent, and that by parties who do not use the box package at all.

We need some careful experiments this season as to the best methods of protection of orchards from frost. There is but little doubt that they can be successfully protected from moderate frosts, but the question is how to apply the heat or smoke in the most effective manner. I wish that you would each of you obtain as much light on this subject as possible.

W. K. NEWELL,
Commissioner at Large.

OCTOBER MEETING, 1909.

GASTON, OREGON, October 11, 1909.

To the Honorable State Board of Horticulture:

I herewith submit my report for the term ending September 30.

The fruit crop of the State as a whole is not a heavy one this year, but it is encouraging to note that the quality is uniformly excellent and that good prices have, in the main, been received.

It is yet too early to give accurate figures on the yield or values received. The only noticeable shortage is in the apple crop, which is also uniformly light over almost the entire United States. Peaches were a short crop in some sections where trees were injured last winter. The pear crop was very heavy in the Rogue River Valley, and a large crop of prunes is now being gathered and evaporated in the Willamette Valley.

A noticeable new feature of the season was the shipping of prunes from the Willamette Valley in the fresh or green stage. This has been practiced from the Snake River and Grand Ronde valleys for many years, practically the entire crop of those sections being handled in this manner, but it has been commonly believed that the valley prune, being so much larger and juicier, would not carry well.

The experience of the season seems to show that when properly packed they can be shipped successfully. Although the profits received were not very large they show a sufficient margin above the prices paid for fruit for evaporating to make their further shipment in this manner attractive.

About 125 cars of green prunes were shipped from Salem, Corvallis, Dundee, and Eugene.

The experiment was also tried of shipping cherries from Salem and Eugene, and, as with the prunes, while the prices received were not what it was hoped to obtain, still it gives good promise of success for the future.

The experience of others in the shipment of fresh fruits shows that some system of cooling the fruit before loading is an absolute necessity for successful handling of all the more perishable varieties. When loaded at once into the iced car and started on its journey there is not sufficient ventilation to carry off the moisture and it condenses and falls back upon the top layers and the result is a large percentage of spoiled fruit.

By the use of a pre-cooling device, of which there are now several successful ones patented, a strong blast of cold air can be forced through the fruit for several hours before shipment and all the surplus moisture removed, and the fruit made to carry many days longer in good condition.

Every fruit growers' union in the State should investigate this matter and prepare to install such a plant before next season. Then, with great care in the selection of the fruit to be packed I am sure we can send our berries, cherries, prunes, and pears to any market in the United States.

When in Washington last June I called upon the officials of the Department of Agriculture and requested their help in this matter of the preparation of green fruit for shipment, and was promised the service of an expert for next season provided we could get our congressmen to secure a small appropriation extra for that purpose. Mr. G. Harold Powell of the Department of Horticulture, who has this work in his immediate charge, was then just on the point of leaving for a trip to the Puyallup Valley, Washington, for the purpose of investigating the shipment of raspberries and blackberries from that district, and I asked that he at least stop at Salem long enough to meet with the officials of the union there. This he did some weeks later and was able to give them some assistance of value and the promise of full co-operation in future.

This is a point that we must follow up and render every assistance in our power to get fully established, for the success of our green fruit shipments is absolutely essential to our full development as a fruit-producing State.

There is every indication of an enormous increase in the acreage of orchard to be planted this coming season; this means many trees and as the home supply is not large great

quantities will have to be imported, and it will require careful work upon the part of our inspectors to see that none but clean stock be allowed to enter. This fact you should each impress upon your county inspectors.

The discovery last season of the dreaded brown-tail moth on shipments of seedlings from France makes it imperative that further importations of this stock be closely examined.

There has been much discussion the present season over the matter of orchard smudging to prevent frost injury. I have taken considerable time to investigate this matter both in Medford district and at Grand Junction, Colorado, and am inclined to think that some rather extravagant claims have been made as to the success obtained. While no doubt much good has been accomplished there has also been considerable money and effort wasted, and we need some very careful work done along this line to determine what is feasible. Next spring the members of the board should co-operate with the Horticultural Department at the State Experiment Station in making some careful tests.

As nearly as I can judge of the results of the work done in various places this season where the trees were of good size and rather closely planted, and the foliage well developed it was possible to raise the temperature to some extent and to maintain it there during the danger season. The best results were obtained where the work was begun before the temperature had fallen.

For the benefit of those who think that the fruit business is already overdone I wish to call attention to the fact that a great many carloads of apples are now being shipped into Oregon and Washington from California points; that we depend on California for fully one-half of our strawberry supply, berries being shipped in from there for weeks after our own are ripe, and that grapes are imported each year from Ohio, Michigan, and Pennsylvania.

There is yet room for the fruit industry in Oregon to expand.

W. K. NEWELL,
Commissioner at Large.

APRIL MEETING, 1910.

GASTON, OREGON, April 11, 1910.

To the Honorable State Board of Horticulture:

Once more has the time arrived for taking account of fruit crop prospects and conditions. Judging from the appearance of the trees in those parts of the State which I have visited

this spring, if we have favorable weather through blooming time, we will surely have a bountiful crop of nearly all kinds of fruit this year. The impression certainly exists this is to be a year of big fruit crops.

Each succeeding year in Oregon shows better general care of the orchards, and although the past winter was a very difficult one in which to accomplish the usual winter's work, it was compensated for by the beautiful month of March which allowed the work to be brought up to date. In many sections the blooming season is nearly over for the early fruits; in others it is just at hand, and with no reports of injury or damage as yet.

PROGRESS OF ORGANIZATION.

A noticeable feature of the past winter has been the large number of fruit growers' organizations which have been formed. Almost every community in which there is now any activity in orchard-planting has its association. Many of these associations will have but a small amount of fruit to market for a year or two, but they will do splendid work in having uniform methods of planting adopted; in guiding their members in the selection of varieties, and in the purchase of all kinds of supplies. And, of even more importance than any of these, their members will acquire the habit of working together and of subordinating individual preferences to the will of the majority.

THE GRAPE JUICE INDUSTRY.

The year 1909 marked the beginning of what I believe will grow to be a great industry, and that is the production of grape juice on a commercial scale. The Concord grape is superior to all others for the production of fine juice, and this grape succeeds admirably on the foothills of Western Oregon. Five thousand gallons of this justice that is the equal of anything on the market is just now being bottled and distributed to the trade, and is meeing with a ready sale. The company which made this juice paid from $35 to $40 per ton last season for the grapes, and tell me they can pay $35 per ton the coming season and for the future if conditions are not materially different. The grape industry has been slow of development in Oregon because of the lack of a certain market; the local markets were easily overstocked and other markets could not be reached, but with a certain market and an attractive price the industry will grow rapidly and can be increased enormously.

THE LAFEAN BILL.

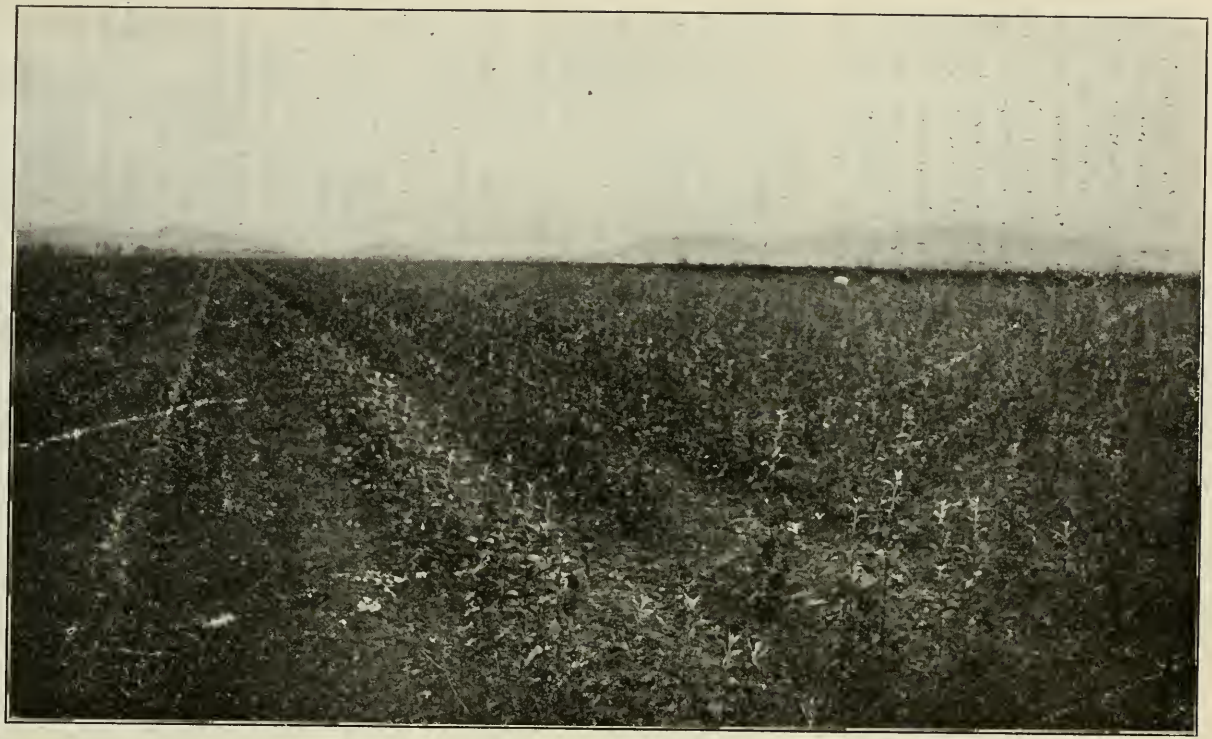
The matter of federal legislation relating to the apple industry has attracted our attention during the past winter, and from present indications will need further attention before the case is finally settled. The Lafean bill, which has been before congress the present session, seeks to accomplish two main objects: to standardize the packages used in interstate commerce, and to standardize the system of grading and marketing the fruit. The reason for the agitation in this direction is that there has been confusion in the markets from the use of four different styles of barrels in the eastern states, and from the use of one size of box in Colorado and another from the Pacific Northwest and California. Absolute lack of any rules of grading whatever in the average eastern barrel-packed fruit also caused discussion.

The objects sought to be attained by the supporters of the bill, who are principally the commission dealers and retail grocerymen of the eastern cities, are laudable; but it seems very improbable that the bill, if passed and enforced, would accomplish the results desired. So objectionable were the terms of the bill to the growers of the Northwest that it was found necessary to send representatives to Washington to protest against it. C. E. Whisler of Medford, J. A. Wilson of Hood River, and myself represented Oregon; and L. B. Monroe of Spokane, and J. A. Tichenal of Wenatchee, appeared for Washington.

The standard apple box provided for in this bill contains 2,342 cubic inches, which is 170 inches more than our present box contains; the contention being that our box does not contain a full bushel, or as the retailer puts it, it will not measure out four heaped pecks such as he must deliver when he sells by the peck or half-peck. This is a very important point, as we found on careful investigation of the markets of all the cities which we were able to visit, that our apples were being discriminated against to a marked degree on this account.

While we were able to demonstrate to the full satisfaction of the committee on agriculture, before whom the hearing was held, that our box, when packed honestly and carefully, would measure out four heaped pecks, yet we were unable to find any boxes of our apples on the regular market at Washington that would measure full quantity. This was the weakest point in our opposition to the bill, and it was very mortifying to have it caused by the carelessness of our own packers.

There has been very general complaint from the dealers and consumers in the eastern markets that our fruit this year was not up to the standard either in pack or quality. We set so



Oregon Nursery Scene.

high a standard in former years and secured such splendid prices on account of it that even a slight falling off is very noticeable and brings a strong protest. Careful investigation showed us that this complaint was justified to a large extent. I wish to urge as strongly as possible upon our growers that such a policy will not do—that it will be suicidal. Only fruit of high quality and absolutely honest pack can be marketed successfully against the strong competition to be met in the eastern market.

We were much indebted to M. O. Lownsdale and to the Hood River and Wenatchee fruit unions for the boxes of splendid apples which they so kindly donated for our use in demonstrating to the committee on agriculture. The committee members also appreciated the apples.

EUROPEAN MARKET CONDITIONS.

I am in receipt of a splendid report on European market conditions from our consul at Belfast, H. B. Miller, which I submit herewith. This will be given as full publicity as possible through the press, and will be published in full in our next biennial report. There are many points in it of the greatest interest to us. The demand in those markets for pears is surprising and we must find the varieties that will be the best adapted for shipping over there. With the completion of the Panama canal we will be able to load refrigerator steamers at Portland and land our fruits in any European market at very low rates.

W. K. NEWELL,
Commsisioner at Large.

FINAL REPORT, 1910.

To the Honorable State Board of Horticulture:

The year 1910 has been the most prosperous one in the history of Oregon horticulture. The apple crop has been fully double that of any former year, and owing to better methods of thinning and spraying, a far larger percentage of the crop has been marketable.

The prune crop was apparently short of normal, but fine weather permitted the entire crop to be saved, and the quality was the very finest, with the price higher than has ruled for several years; so that the aggregate value is above the average.

The peach crop was something phenomenal; it seems as though every peach tree in the northwest fairly outdid itself in producing a crop. There were too many small peaches on the market throughout the season, and prices were depressed

largely on that account. Peach growers must thin their fruit more carefully in years of heavy crop. With the immense number of peach trees being planted growers will in the near future be compelled to make provision for canning and drying a large percentage of the crop. Dried peaches are in good demand and at fair prices and a reasonable profit can be made in disposing of the crop in this manner.

The pear crop was about the same as that of last year, frosts having done some damage at blossoming time. All fruits have ripened early this season and for that reason the Bartlett pears from Oregon crowded the California crop very closely in the eastern markets and did not bring quite the prices they should have done. Still, prices were very attractive and leave a handsome margin of profit to the grower. Comice, Anjou, and Winter Nelis pears brought fancy prices.

The season was an exceptionally favorable one for grapes and the crop was the largest and finest ever produced. The grape sections of Eastern and Southern Oregon sent in fruit of the California varieties that surpass anything that California has sent to our markets, while Willamette Valley points supplied local and Puget Sound markets with the finest kind of Concords, Niagaras, etc.

The fruit crop of Oregon should double every two years in the near future and our problem is now principally one of proper distribution. Gratifying progress is being made in the enlargement of work of the fruit growers' unions. The Rogue River growers have consolidated all their local unions with headquarters at Medford, and for the first time the Umpqua Valley growers have succeeded in handling large lots of pears and apples for eastern shipment. The Hood River union continues its good work by again making the best sales of apples reported from any point in the Northwest. The Milton-Freewater growers have made a splendid success of the work of their union for the season. The Lane County growers have enlarged their capital stock and have taken over the local cannery and evaporating plant and are now splendidly equipped for business and are doing plenty of it. The Salem growers have built a large prune-packing plant in addition to their packing house for fresh fruits. They have again shipped fresh prunes to eastern markets with good success, and also handled a number of cars of Gravenstein apples.

This work of organization must continue until we have a local union in every fruit-producing locality and a central selling agency for all the unions.

I submit the following estimate of the amount and value of the crop of the different fruits grown in Oregon in 1910:

	Amount.		*Value.*
Apples	2,650,000	boxes	$2,500,000
Pears	292,000	boxes	420,000
Peaches	970,000	boxes	485,000
Cherries	4,600,000	pounds	200,000
Plums and Fresh Prunes	300,000	crates	195,000
Dried Prunes	28,000,000	pounds	1,680,000
Apricots	15,000	boxes	10,000
Grapes	4,500,000	pounds	135,000
Strawberries	10,500,000	pounds	577,000
Blackberries	1,750,000	pounds	75,000
Raspberries	2,250,000	pounds	105,000
Loganberries	4,000,000	pounds	165,000
Currants	425,000	pounds	25,500
Gooseberries	500,000	pounds	20,000
Quinces, etc.			35,000
Nuts	250,000	pounds	35,000
Total value			$6,662,500

W. K. NEWELL,
Commissioner at Large.

Three-year-old Apple Orchard of B. N. Sproat, Between Beaverton and Reedville.

REPORT OF M. O. LOWNSDALE

Commissioner for First District.

APRIL MEETING, 1909.

LAFAYETTE, OREGON, April 12, 1909.

To the Honorable State Board of Horticulture:

Horticultural conditions in the first district of Oregon were never so promising in many respects as at the present time. There is a disposition to work for a distinct betterment of orchard conditions. This disposition is wide spread and is increasing in fervor and gives hope of clean orchards and consequent thrift in the Willamette Valley in the very near future. During the past year the battle for upholding the law and of compelling negligent orchard owners to respect the authority of the State board has been fought out. It had to be fought out sooner or later and ample time had been given for preparing and educating uninformed growers. When the fight came the authorities were splendidly backed up by the courts, and we are now able to send our inspectors afield with full confidence in their success. The leaven of thrift and cleanliness is at work and on every hand is seen evidence of a disposition to accept the inevitable and to rid the State of the worst menaces to the fruit-growing industry. The effect of this revolution in the dispositions and methods of owners of old orchards who have hitherto been obstructionists has been to give a renewed confidence in the horticultural possibilities of the western portion of our State. The Willamette Valley has again come into her own—please God—never again to be dispossessed.

I have little to report about fruit prospects for the present year. It is too early to predict with any certainty. Present conditions if continued will give a fair crop of all fruits with the possible exception of apples.

In the first district apple orchards are not showing a heavy per cent of bloom. The district seems spotted—a full crop here and there, while in the same neighborhood orchards will be bare. There may be a possible 40 per cent crop.

The cherry crop will probably be large unless cold rains intervene within the next two weeks. But the market outlook for the cherry crop is not of the brightest, much of the canned output of last year being still unsold. Some cannery com-

panies are discussing the advisability of not operating their plants this season. Such a course would dump a lot of fruit on local markets, with disastrous results to the growers.

The detail work of county inspectors in the first district has been progressing slowly because of the difficulty of getting qualified inspectors. Appointments have been made recently, however, which will insure more vigorous enforcement of the law in all counties. County courts in this district are awake to the vital necessity of keeping inspectors in the field if we are to build up the fruit industry and make certain the economic development of our section. The necessity of constant watchfulness to prevent the spread and to stamp out apple anthracnose, the "dead spot" disease, has excited intense interest in the minds of county judges and commissioners. If it were not for the wise support of these authorities we could accomplish little in the line of inspection. Our counties are so large that an inspector must be employed continuously if improved conditions are to be enforced in all sections. It is pleasing to note, however, that in Yamhill County, where the battle to establish respect for the law was fought out last year, more progress is being made in cleaning up old orchards than elsewhere in the State. Inspectors find but little opposition to their orders to renovate. From this time forward enforcement of the law will simply be a matter of constant watchfulness and attention to detail.

M. O. LOWNSDALE,
Commissioner for First District.

REPORTS OF CHAS. A. PARK

Commissioner for Second District.

OCTOBER MEETING, 1909.

SALEM, OREGON, October 11, 1909.

To the Honorable State Board of Horticulture:

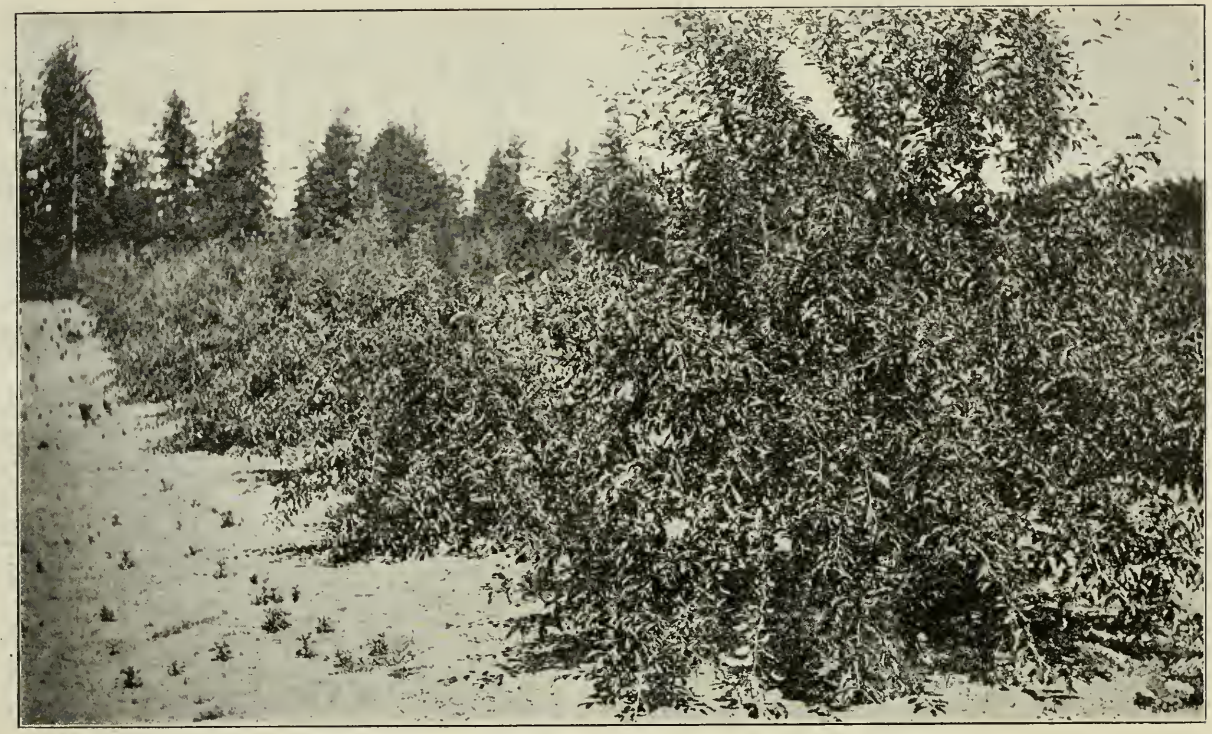
I beg leave to submit this my report upon the horticultural conditions in the second district, dealing in particular with that portion of Oregon known as the upper part of the Willamette Valley—that part south of Clackamas and Yamhill counties.

When we are in doubt as to just what topic upon which to lead out, we always feel it is safe to talk about the weather, so I wish to tell you that the climatic conditions during the past winter and spring have not been at all favorable to fruit trees and their crops. The unprecedented cold snap we experienced last January killed many small trees that had been planted the season before, and in some few cases old bearing trees were killed. I might state in passing that the old trees that were killed were growing in a soil where the moisture was more than normal, which kept the trees full of sap until late in the fall and the wood had not seasoned up.

The spring opened late and dragged on slowly—cold and cheerless. The pears bloomed abundantly and the fruit set full. After the pears had reached the size of half an inch in diameter many fell off leaving hardly 25 per cent of a crop. The apples didn't bloom with any promise of a crop. What fruit set on the apple trees stayed with us and promise to give up 20 per cent of a crop. The peaches in our district did well. I can report that the condition of the peach trees and the crop was normal and that the peach growers have enjoyed a full crop.

The cherries bloomed full, but the cold, backward spring thinned the crop to 50 per cent. The prunes came through the season in good condition. We have a full crop of prunes. If any complaint is to be made, it is that there are too many prunes on the trees, which has reduced the size.

The interest in horticultural matters in the second district has been going forward and upward. Old orchards are becoming fewer and some are being made to produce good crops of good fruit. The owners seem to have dis-



Five-year-old Jonathan Apple Tree, Willamette Valley.

covered a good profit in a resource which had been abandoned. In fact, the Willamette Valley appears to have been discovered by a new lot of explorers. Much land has been planted to all kinds of fruit and the inquiries as to what varieties of fruit to plant have exceeded those made at any previous time in the history of the Willamette Valley.

The question naturally comes up: If all these people go into fruit growing what will we do with the fruit that is raised? Where will we find a market? For the past ten years, at least, the experience has been that the price of fruit has been on the up grade and the quantity raised has made it necessary that the quality be on the up grade also. Growers are organizing fruit unions where they can unite in preparing their fruits for market. The packing is as essential as the growing.

Cherries and fresh prunes have been shipped successfully from the Willamette Valley this year, a thing that has not been attempted in many years. Where sufficient quantities of fruit are raised in this section, it will warrant the expense of the establishment of pre-cooling stations. I have been informed by the men who were detailed by the agricultural department of our government to experiment in the pre-cooling of fruits for shipment, that our cherries, prunes, peaches, loganberries, raspberries, and strawberries may be cooled before shipping and then shipped to any part of the United States.

Thus our markets may be enlarged and extended. We can raise the stuff if we have a market to reimburse us for the expense.

CHAS. A. PARK.
Commissioner for Second District.

FINAL REPORT, 1910.

To the Honorable State Board of Horticulture:

I herewith respectfully submit my report as commissioner of the second district for 1910.

This district consists of the counties of Lane, Linn, Marion, Polk, Benton and Lincoln. Lane County is the most southerly county in this district and extends from the summit of the Cascade Mountains west to the Pacific Ocean. Linn County extends from the summit of the Cascade Mountains west to the Willamette River. Benton County lies immediately west of Linn County and extends into the Coast Range where

Lincoln County begins and continues to the Pacific Ocean. Marion County lies north of Linn County and Polk County lies north of Benton County. These counties comprise the greater part of the Willamette Valley, which was the earliest developed part of Oregon, and the first to develop the horticultural side of farming; the first to grow the big red apple, at which time apples and pears were grown to perfection with little or no care, for the reason that there were no insect pests nor fungus diseases to destroy or mar their normal development. The apple orchards that came into bearing first bore fruit that sold for a nominal price of $16 per box. Many of these old orchards are still standing and they still contain trees as sound as the sturdy oaks that grow near them. I am sorry to say that many of these old orchards have been neglected and have received no care or attention for years; they have been left to grow wild, the owners thinking that such trees are of little or no value. I will cite one instance to show what can be done with these old trees. A young man in Marion County had one of these old orchards consisting of a few acres on his farm. Rather than cut it down he pruned, sprayed and cared for these trees according to the best methods known to orchardists. The first year after he commenced the care of these trees, he was rewarded with a crop of beautiful waxen apples which netted $500 per acre.

Many inquiries have come to my desk within the past two years asking for information concerning each of the particular counties which make up the second district, and a few words at this time along the line of general information may not be amiss.

The topography of this section of the State consists mainly of a large valley through which flows from south to north the Willamette River, the headwaters of which are in the mountains of Lane County. This Willamette Valley—an area of five million acres—is bounded on the east by the summit of the Cascade Mountains, on the west by the Coast Range, and contains the elevated mountains on each side with their corresponding foothills, and the broader rolling lands of the lower reaches extending to the banks of the Willamette River.

The western parts of Lane County and Lincoln County lie in the Coast Range and consist of mountains with their valleys and streams which are tributary to the Pacific Ocean.

The Willamette Valley, with its alluvial bottom lands, its upper benches of gray clay loam, and its hill lands of red soil gives opportunity for the successful production of many varieties of fruit. The alluvial river bottom lands consist

of a rich, sandy soil and will grow nearly everything that can be grown in Oregon. Fine quality of peaches are grown on this soil with few failures from frost. The American varieties of grapes do well. Pears, apples and cherries are successfully grown. All kinds of berries and garden truck do exceedingly well.

The gray clay loam of the bench land is especially adapted to the growing of a fine quality of apples and pears, but care should be exercised in selecting this land for planting orchards. Much of this land is wet and will have to be tiled before any kind of a tree can be grown successfully.

The red soil of the hills produces excellent prunes, cherries, apples and pears. It has been demonstrated that a hillside with the right slope to the southwest produces a high colored fruit.

The climatic conditions of the Willamette Valley are peculiarly adapted to the successful growing of fruit. During the summer months little or no rain falls, which gives the orchardist the most favorable opportunity for applying the sprays to his fruit trees and the best of conditions for harvesting his crop. The soil of the valley is such that with proper cultivation the moisture in the ground can be conserved so that a much better quality of fruit is grown than can be produced by means of irrigation. To irrigate fruit trees in the Willamette Valley would entail a loss in two ways: the expense of irrigation would be needless, and the results of irrigation would be a positive injury to the fruit, both in quality and keeping properties. I understand that next year many fruit growers of this State who do not irrigate their fruit will label each box of fruit "not irrigated" so that the buyer may distinguish such fruit from that grown on irrigated lands.

The Willamette Valley is well served with transportation facilities. It is traversed by the main line of the Southern Pacific Railroad which passes through Woodburn, Salem, Jefferson, Albany, Eugene and Cottage Grove with branch lines of the Southern Pacific Railroad running out of Portland on the west side of the Willamette River. One branch extends as far south as Corvallis in Benton County and the other extends to Dallas in Polk County.

The Corvallis and Eastern Railroad passes from east to west through the counties of Marion, Linn, Benton and Lincoln, beginning in the Cascade Mountains and terminating at tide water at Yaquina Bay where ocean going vessels may dock. Besides these railroads there are numerous electric lines being projected throughout the valley. One electric

A Cherry Avenue, Lane County.

line of importance is the Oregon Electric built several years ago between Salem and Portland. It must also be remembered that the Willamette River is navigated by steamers between Portland and Salem throughout the year. Thus it may be seen that the produce which is raised in this valley may readily reach a market.

During the past two years many acres have been planted to apples, prunes, pears, peaches and walnuts. The planting of apples far exceeds any of the other varieties of fruit. The opportunity and favorable conditions have attracted many fruit growers to this section of Oregon who are going forward either on a small or large scale. It is not uncommon to find individuals and companies planting from 100 acres to 600 acres to fruit.

In the year 1909 the fruit crop was not satisfactory neither in quantity nor quality. This condition was not confined to this district of Oregon alone, but was the same throughout the northwestern part of the United States. The year 1910 has been very satisfactory. The fruit crop for the year 1910 for this district is estimated as follows:

Apples	500,000	boxes.
Pears	60,000	boxes.
Peaches	75,000	boxes.
Prunes (cured)	9,000,000	pounds.
Cherries	2,000,000	pounds.
Strawberries	1,000,000	pounds.
Loganberries	3,000,000	pounds.
Raspberries	500,000	pounds.
Blackberries	250,000	pounds.
Gooseberries	200,000	pounds.
Grapes	100,000	pounds.

CHAS. A. PARK,
Commissioner for Second District.

REPORTS OF A. H. CARSON,

Commissioner for the Third District.

APRIL MEETING, 1909.

To the Honorable State Board of Horticulture:

As commissioner of the third district, I respectfully submit my semi-annual report to the thirty-first of March, 1909. The past winter in Southern Oregon has been favorable for all kinds of fruit trees, vines, berries, etc.

While colder than a normal season for that section of the State, no extremes of temperature have been recorded to in any way damage the tenderest of fruits. The cold weather during January and February came on gradually, which was an advantage to prepare all orchards to withstand the lowest temperature, 17 degrees above zero, which occurred in January. This low temperature in no case injured the tender terminal twigs of any of our fruits. From the fact that our fruit trees have wintered in such fine condition, nurserymen in the northern part of the State, Washington, Idaho, and Montana, have shipped many thousand of apple and pear scions from the Rogue River Valley the past winter for propagation.

The present promises for a record-breaking crop for all kinds of fruit were never better. March being a cool month, the bloom is two weeks later than in a normal year. February being a wet month, spraying with the lime and sulphur compound was retarded, but March conditions being favorable, spraying for the scale was universal throughout the district.

Jackson County has been very active in planting out new orchards. It is a conservative statement to say that in this county there have been 1,000,000 apple and pear trees planted the past winter.

Josephine County has planted a number of new apple and pear orchards, and of grapes the county has planted near a half a million vines, the Tokay and Malaga being the varieties mostly planted. Were the hills and slopes of Josephine County cleared of brush and timber, grape planting would have been very large in this county.

Douglas County is taking on new life in her horticultural development. Many new apple and pear orchards were

planted the past winter, and many acres of her choice lands for the apple and pear are now being sold, and another year will see vast orchards of apples and pears planted in this county. Douglas has such a vast acreage of choice apple and pear lands that are so well adapted to growing this fruit, that in a few years it will be the leading fruit section of the State at the present rate of planting.

Inspector Stearns of Klamath County writes me there has also been unusual activity in that county the past winter in planting commercial apple orchards. With railway connections now had at Klamath Falls horticultural development will be rapid.

The pear blight that threatened the pear and apple orchards of Jackson County is now under control. Through the teachings of Professor O'Gara our fruit-growers have learned how to meet this dreaded disease. Inspectors Taylor and Smith of Jackson County have been active, and taught growers how to combat this disease successfully.

Orchards that would have soon been destroyed by the germ were treated by cutting out the diseased parts, and saved. To treat the pear blight with success when the trees are dormant the grower must know how to identify hold-over blight, and cut out all diseased parts. I confess when the blight was first discovered in the orchards of Jackson County, I looked upon it as a serious problem, and it was a serious one, but with the aid Professor O'Gara gave us we have been taught how to successfully handle it.

A. H. CARSON,
Commissioner for Third District.

OCTOBER MEETING, 1909.

To the Honorable State Board of Horticulture:

I respectfully submit the following report of the horticultural progress and present conditions of the fruit industry in the third district for the past six months.

At the beginning of the growing period this season promises for a record output for all kinds of fruits were flattering. As the season of growth advanced it became apparent these promises, owing to abnormal climatic conditions, were not to be realized. From the middle of March until late in September the rainfall was practically nothing. Usually in all normal years during April, May, and June the Rogue River Valley has ample precipitation to stimulate the growth of all kinds of fruits and agricultural crops, but this year during these months we had no rains, with cool north winds prevail-

Peach Tree, Merlin District. Yielded 25 Boxes, 1910.

ing which dried the ground to such an extent that it was almost impossible to cultivate and put the ground in condition to conserve the moisture. All these conditions were a handicap to the fruit grower's anticipations of a large crop to supply market demands that always prevail in the Rogue River Valley for her superb apples and pears at harvest time. The low temperature during the blooming period kept the fruit-grower of the valley in a nervous condition, and had it not been for the energy and push and practical knowledge of the virtue of smudges during frosty periods of P. J. O'Gara, the government pathologist, assigned to aid the fruit-growers of this district in eradicating the pear-blight in this district, the greater part of the apple and pear crop on the lower levels would have been lost through frost. During this frosty period, Professor O'Gara, with headquarters at Medford, watched the temperature, and when it become dangerously low, warned the growers by telephone, and smudge fires were built to protect the buds from the blighting frost. Had it not been for Professor O'Gara's zeal, and the confidence his ability inspired in the pear and apple growers in and about Medford, Grants Pass and Ashland, our fruit crop this year would have been a very small one. Every fruit grower that heeded Professor O'Gara's warning and built fires and smudged as he directed, saved fruit on all the low levels where low temperature is dangerous. Many growers for want of faith did not heed his warnings, and lost all their fruit. That it is as much a practical detail of the fruit-growers' duty to smudge for frost during the frosty periods as it is to spray with lime and sulphur for the scale or to spray for the apple worm with arsenate of lead, is evidenced by the object lesson we had in the Rogue River Valley last spring. Last June, I spent several days with Professor O'Gara and Inspector Taylor visiting the pear and apple orchards of the valley about Medford, and Central Point. Every orchard along Bear Creek that had been smudged as directed by Professor O'Gara was loaded with fruit, and was being thinned at the time of our visit. Adjoining the heavily loaded orchards that had been smudged were orchards without fruit that the owners had neglected to smduge. If any fruit had been left on these orchards that had not been smudged, the quantity was very small, and what had been left showed frost marks that would prevent it maturing to fruit that would have a market value.

There are no fruit zones in any section of the United States but have some springs liable to killing frosts. The fruit-grower to be up-to-date, must be prepared with mater-

Dory Peach Orchard Near Merlin.

ials on hand to smudge his orchards and save his fruits, or else his endeavor for a year is lost through a killing frost. It is useless for the man without faith in the virtue of smudge fires to protect fruit from frost to argue against the demonstrations that were had the past spring in the Rogue River Valley. The men who smudged and attended to it have this fall a large crop to market. The men without faith lost theirs. The knowledge gained through these experiments of smudging should not be ignored by the progressive fruit-grower, but he should be prepared to smudge his orchard next spring, if necessary. The time to prepare for smudging is NOW. Preparation should not be put off until the busy work of pruning, spraying and cultivation of spring work, or else when spring arrives it will be neglected, and should frost occur, for want of preparation the crop again would be lost. Many methods were employed in the Rogue River Valley the past spring in smudging. Some used the patent oil pots and crude oil, while others used such materials as prunings, shavings, and wood picked up about the wood-lot, and the results were all alike. Those who energetically built fires and smudged saved their fruit. One thing was demonstrated during the period of smudging, that when the temperature becomes low enough so that fires should be started, a small amount of crude oil in dry kindling was a material help in starting the smudge quickly; or where oil was not used to start the fires with quickly, pitch kindlings, so plentiful through our pine woods, were used with good results. Where the oil pots are not used, wet straw, or new barnyard manure is good to deaden down the fires after well started, as this material gives off a dense, heavy smoke, and I used it more than twenty years ago to save peaches from a frost with success, when on the same night neighbors adjoining me lost all their fruit. Preparation for smudging must be from now on one of the details of the fruit-grower if he would profit and get the most out of the industry.

The results of smudging for frost the past spring gives the Rogue River Valley about 400 cars of pears, and about the same number of cars of apples to ship to eastern markets this fall, but had the smudging not been done we would have had but a small number of cars to ship this year. The loss from frost was much greater than the amount we will ship from this valley this year, owing to so many growers lacking in faith, and ignoring the warnings sent out by Professor O'Gara. Had his warnings been heeded, and fires for smudging been general throughout the valley, this fall this valley would have approximately had 2,000 cars of apples and pears

for market. It will be a reflection on the intelligence and energy of any fruit-grower of this valley if he fails to smudge for frost next spring, should the necessity require it.

PEAR BLIGHT.

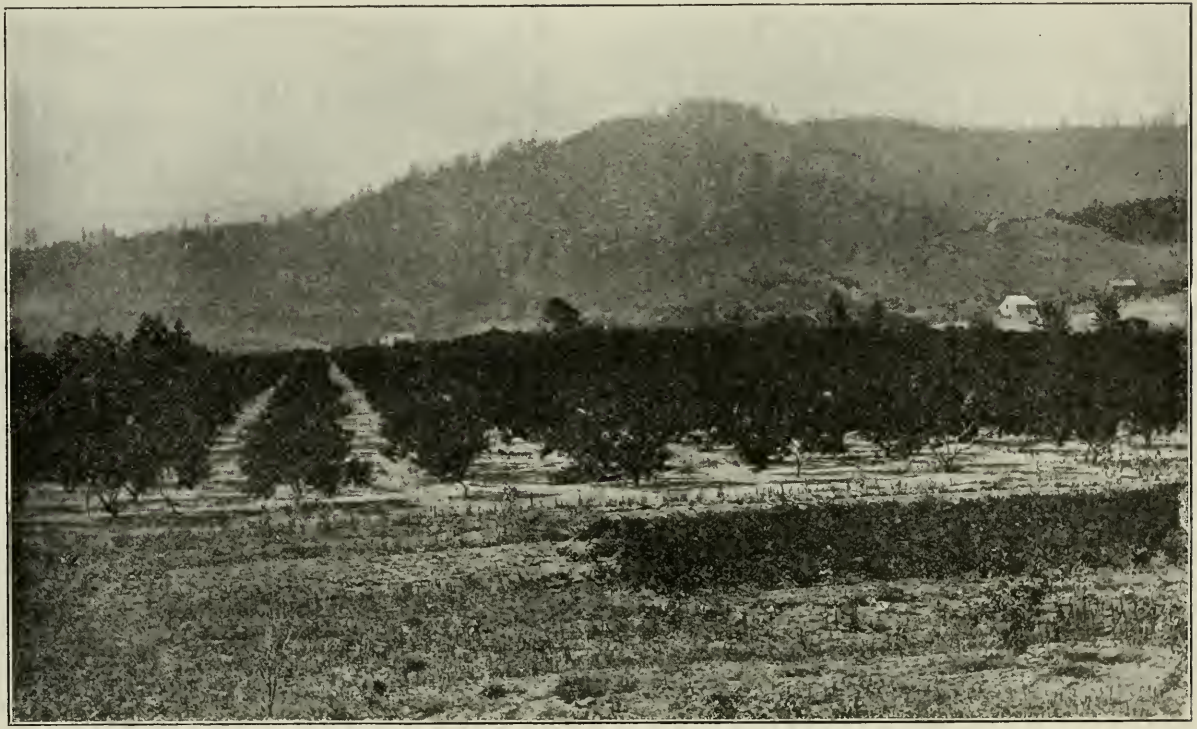
This is a germ or bacterial disease of the pear, apple, and quince. Professor O'Gara says it affects the wild crab apple, haw and serviceberry. A little more than two years ago this disease appeared among some of the apple and pear trees of the valley. When it first appeared none of our growers had any knowledge of a practical nature as to its treatment. Many fake remedies and suggestions as to controlling it were scattered among the fruit-growers, and not until Professor P. J. O'Gara, government expert on pear-blight, was assigned to this district to aid the growers was any progress made in controlling the diesase. Pear blight in its worst stage was called "sour sap" by growers who were without knowledge as to its origin, and their remedy to relieve the "sour sap" they supposed was the matter of their trees only spread the germs of the disease, and caused increased infection of healthy wood. About fifteen hundred trees that were in bearing were lost from pear-blight in the Rogue River Valley for want of scientific knowledge as to what the disease was, and its method of treatment. Professor O'Gara taught our growers how to treat the disease with success, and how to identify it. Now we are having gratifying success in controlling it by cutting out the parts of the tree that are infected with the germs.

There are but two ways for a healthy tree to become diseased with the germs. One through the blossom, and the other where an abrasion is caused by careless cultivation.

In all cases where pear-blight exists in an orchard the source of annual infection is from hold-over blight that becomes established in the larger sappy limbs. The germ, to live through the winter, must have ample moisture, and the larger limbs furnish this moisture. For want of moisture, many germs perish in the smaller limbs, but hold-over is sure to be found in the spring if not sooner discovered and cut out. As the tree becomes dormant in the fall and sap ceases to be active, the germs in a hold-over case also become dormant, and do not multiply rapidly. With the first warm days of spring the sap becomes active, the heat of the sun warms up the hold-over, and the diseased tissue of the hold-over ferments, and the fermented sap exudes, carrying millions of germs. The bees and other insects feed on this diseased flow from the hold-over, fly to a pear or apple bloom, and infest

it with the germs. At the blooming period the sap is very active, and where many hold-over cases have been permitted to develop the source of annual spring infection to the bloom is great. In a short time after infection of the bloom it will be noted that the infected bloom begins dying, and in a few days the terminal limbs begin dying back very rapidly. Every grower, immediately on noticing the terminal growth dying back, should not neglect for a moment to cut out the limbs that show infection, and burn the same. In cutting out diseased twigs, cut well below the part that shows disease, and always sterilize the shears, or knife with corrosive sublimate. For sterilizing the knife buy a 25-cent bottle of antiseptic tablets that are soluble. Dissolve two of these tablets in eight ounces of water, dampen a sponge with the solution, and as every limb is cut off wipe the knife across the sponge to prevent infection when cutting off a new limb. Sterilizing the knife after cutting off a diseased limb is very necessary, as it is possible you might not get below the infected part on the limb, and in cutting off the next limb in healthy tissue you are liable to cause infection from the knife. Professor O'Gara says that the germs of the pear-blight are so small that the pricking of a needle into a case of hold-over, and then pricking the same into healthy tissue would infect it.

Were the dangerous character of the pear-blight fully understood by the fruit-men of Oregon, they would not delay a moment from discovery of the disease in their orchards until they would be cutting it out, and burning the diseased wood. It is an easy disease to treat and destroy, if taken at the beginning, but if permitted to spread and become well established in an orchard or fruit district, it becomes a serious problem and means expense and worry, as well as loss. It is an easy problem, if one discovers a fire in a dwelling, at the beginning to put it out with but a little loss of time and injury to the building, but neglect it, and the building is lost. So, too, with the pear-blight, it is as necessary to begin active work at the moment it is discovered to save the orchard as it would be to put out the fire in a dwelling when first discovered. To illustrate: In July, 1908, I was in Douglas County looking over the orchards. I found no pear-blight for nearly a week and believed it had not got established in that county. While in Edenbower in Mr. Hays' orchard of thirty-five acres, I found two pear trees that were diseased with the blight. Mr. Hays and myself cut out all diseased twigs, and destroyed them. Mr. Hays then called my attention to a few pear trees in an orchard adjoining, owned by Mr. Lyons.



Muir Peach Orchard of Prof. Joy, Ashland.

We made an examination of these trees and found them diseased with the blight. I instructed Mr. Lyons how to treat the trees and cut out the diseased germs, which he promised to do the next morning. Mr. Lyons cut out the diseased twigs on three of his trees, and left two trees that showed but a slight indication of the disease. In July, 1909, I was in both the Hays and Lyons orchards. The two trees Mr. Hays and I treated were healthy and free of the disease, nor was there a tree to be found in the Hays orchard but was free of the blight. At the same date the Lyons orchard was examined, the three trees he had treated were healthy, and free of the disease. The two trees in this orchard which in 1908 showed but slight infection and were not treated, were nearly dead in July, 1909, with the blight. His (Lyons') neglect to cut out the few diseased twigs had evidently permitted the development of hold-over blight, with the result that more than fifty apple and pear trees in the vicinity of these trees had become diseased with the blight. The Lyons orchard is east of the Hays orchard, and the trees that were infected from the hold-over in the trees neglected were around these neglected trees. In that locality the prevailing wind in spring is from the west. The bee, the germ carrier, fed upon the diseased sap that flowed from the hold-over, and was the cause of so many trees being diseased with the blight in the Lyons orchard. The disease is now in Douglas County, but I have every confidence of controlling it through the activity of Inspector McCall, of that county. We know the results of the blight in California, the loss the orchard men of that state had a few years ago. Also, we know what the blight has done for eastern pear growers. To save the pear orchards from this disease, when now we know it can be done (thanking Professor O'Gara for teaching us how), should we not alarm the apple and pear growers of this State to a realization of the danger of the disease, as the people of Jackson County are now alarmed, and exterminate it as they are doing? Jackson County, with her large acreage, is making a successful and determined fight, with O'Gara at the head of four inspectors who work every day. A large acreage in orchard takes much help, and Jackson's county court, alive to the necessity of the situation has given me four inspectors who are succeeding. We should at all times antagonize the advertised remedies. There is no spray that can reach the blight. The only remedy is to cut it out.

Many growers mistake the pear-blight for apple anthracnose. Apple anthracnose is a fungus disease, and the remedy for the disease is spraying with bordeaux early in the fall. The bor-

deaux kills the fertility of the spore of anthracnose, and removes the cause of the disease. Anthracnose grows into the bark of the tree, destroys the tissue, and a dead spot is the result. Anthracnose is always dry, it never exudes sap on the part of the tree it has its growth. In all hold-over cases of pear-blight it ferments the sap, and causes it to exude and drip when the sap flow is active in the spring. To identify pear-blight cut into the affected part of the tree where it is working, and you will find a brownish discoloration of the inner bark next to the hard wood. In many cases of pear-blight you will find it running down one side of a large limb, or the trunk of the tree, and where the germs are at work can be readily detected by this brownish discoloration next to the wood. Where a large limb or the trunk is affected, follow down with the knife, and cut out all that part of the side of the tree that shows unhealthy tissue, and you can save the tree. Frequently we find large limbs, in bad cases of long infection where the brownish discoloration girdles the limb. In such cases the limb should all be cut out below where infection shows. Where the entire trunk of the tree is infected with the germs, then cut down the tree, and burn it. I feel sure the apple and pear growers of Oregon should be awake to the dangerous character of the pear-blight, or else when it becomes bad in a district it becomes costly to control it, if it does not destroy the orchards.

A. H. CARSON,
Commissioner for Third District.

FINAL REPORT, 1910.

To the Honorable State Board of Horticulture:

I herewith respectfully submit my biennial report for the Third Horticultural District, embracing Coos, Curry, Douglas, Josephine, Jackson, Klamath and Lake counties. This report covers, to an extent, the development of new orchards planted for commercial purposes during the two years, 1909-10.

The past two years the planting of new orchards in the third district has been greater than ever in the history of the fruit industry. This activity of the land holders in planting new orchards to the apple and pear is being stimulated by the high prices apples and pears from the Rogue and Umpqua Valleys sell for in eastern markets, and the seemingly unlimited demand for the fruit of these valleys. I believe I am warranted in saying that nearly all the progress made the past six years, in better homes and the easy financial condition

of all the people in Jackson, Josephine, and Douglas counties, is due to the fruit development had during that time. The evidence of this prosperity is seen in the growth of the towns in this district. Four to five years ago, Ashland and Medford, in Jackson County, Grants Pass, in Josephine County, and Roseburg, in Douglas County were small places from 1800 to 2500 population, but are now cities with population from 6000 to 9000 people. The principal business streets of each of these cities have been paved with bitulithic. Miles of wide cement sidewalks have been constructed. In connection with five or six public school buildings in each place, each city has constructed high school buildings that have cost thousands of dollars, and maintain first-class high schools. A portion of the improvement of this section is due to mines and lumber, but 75 per cent is due to the development of the fruit industry—the production of apples, pears, peaches, table grapes and small fruits.

I estimate that the taxable property in the district has more than doubled in the past two years for the reason that our people have learned, after many years, the great value of the soil and climate of the Rogue and Umpqua valleys for growing apples and pears for the world's markets. Sixty years ago, back in the fifties, when Jackson Creek, Rich Gulch and Stirling diggings were yielding thousands of dollars in gold to the miners of Jackson County, and Althouse, California Bar, Sailor Diggings, and Galice Creek were making the miners of Josephine County rich, with money to burn in those early days, then when the mines "petered out" and the miners left the country, and flocked to Frazier's River in 1858, there was perhaps not a man in all this country but thought they had taken everything worth taking, not realizing for a moment that they were leaving the best soil and climate on earth which later generations would take advantage of, plant thousands of acres of orchards, build elegant homes, and create a lasting industry that would produce riches the early Argonaut never dreamed of. Had the Argonaut of the fifties been able to see what intelligent development on higher lines of civilization could do in the development of the natural resources he then overlooked in the Rogue and Umpqua valleys, today he or his descendants would be in possession of the "golden fleece."

As an evidence of the optimistic faith the people have in the possibilities of the future of the fruit industry in Southern Oregon, the acreage planted to new orchards has been larger in the third district than ever before. Eight thousand acres were planted to apples and pears in Jackson County during

the winter of 1909-10; three thousand acres in Josephine County, and five thousand acres in Douglas County. In fact, had it been possible to have procured the young trees of varieties desired, many more acres would have been planted.

Four county inspectors were on duty every day during the winter inspecting nursery stock at Medford, Ashland, Central Point, and Gold Hill in Jackson County. I have instructed all inspectors to make rigid inspections for insect pests and fungous diseases injurious to fruit trees, and in many instances they found diseased stock from other states which were condemned and not permitted to be planted. The fruit grower has enough to do, starting with healthy nursery stock, to keep it healthy during its maturing to a bearing age.

The great demand and high prices for nursery stock stimulate unscrupulous tree dealers to ship in nursery stock that they evidently know is diseased, taking the chance that it might slip by the inspectors and be delivered to the consignees. Through the rigid inspection had in the third district the past two years these unscrupulous tree dealers have not profited to the extent of their desires. In one instance two cars of trees were shipped to Medford; part of the stock was healthy and good, but in each bundle of 25 trees in the two cars about half were diseased. When the condition of the stock was discovered by the inspector at Medford and the consignor's attention called to the diseased trees among the healthy, the seller demanded an inspection and a segregation of the healthy trees from the diseased ones. The inspector notified me, and I at once quarantined the two cars, and would not permit an inspection and segregation excepting at the expense of the consignor. The consignor wanted the diseased trees after segregation to ship back home, presumably to ship to some other district where the inspection is less exacting.

I had the diseased stock burned, and the healthy stock I permitted to be delivered on payment of the inspector's work for the inspection.

Unscrupulous dealers must be taught that the sorting out of bad diseased trees shipped here to be imposed on our tree planters will hereafter be at their expense, not at the expense of the county or State.

Many eastern people are coming here each year, purchasing land, and planting the same to orchards, apple and pear. Many of these people are without experience as to soils adapted to growing fruit or the subsequent management of an orchard after planting out. Land to them is land. They come here with the "land hunger," to live the "simple life." There is no doubt that some of these people have made serious

mistakes in buying land that is not adapted to the fruit they desire to grow. They believe (and this belief is encouraged by unscrupulous land dealers) that to own land in fee, plant it to apples and pears, means they have built a foundation for an income for life. Where land is well adapted to the growth and maturity of these fruits this is true, providing the grower bestows intelligent labor, and plenty of it. Any and all men who have for a number of years been growing fruit here with success, making money—big money, for the capital invested—owe their success to their willingness to do the hard work that must be done to make an orchard a paying investment. There are no details in the management of their orchard that are neglected. Cultivation, spraying, pruning, thinning the fruit at the proper time, carefully gathering it, and properly packing it for market are attended to, hence their success. To be a successful fruit grower is "not a picnic."

New people coming here from the east have as a usual thing not considered climatic conditions as they are on this coast. They take the tables giving our annual rainfall and compare it with the same in the state where they came from, and find it the same, or nearly so. The greater rainfall in the east is had during the growing season of crops, while here the greater part of our annual rainfall occurs during the winter months and early spring, and but a very light rainfall occurs during June, July, August, and September, when crops of all kinds grow and mature. For the want of rain here during the growing period but few weeds grow on some of our best fruit lands, and from that fact many neglect to cultivate their orchards to conserve the moisture that goes into our soils from the winter rains. These dry soils without cultivation soon lose the moisture by capillary attraction. Under a hot sun during the dry period here capillary tubes form, and the action of the sun's rays pumps the moisture from the soil that should be conserved and retained for the growth of the orchard. During the dry season there are but few soils in this section but should have the top surface fined and worked into a dust for a mulch to conserve moisture. After the top soil is worked into a fine dust, capillary tubes will soon form under a hot sun, and where an orchard is maturing a large crop of fruit or a young orchard is to be kept thrifty and growing, this top dust mulch should be stirred once a week in Southern Oregon with a harrow or spring-tooth until September first to firm the soil and cut off these capillary tubes.

MISTAKES OF NEW ORCHARD PLANTERS.

In many new orchards the past year I have noted that the owners were growing between the rows of young trees wheat

Overland Orchards. Remaking 45-year-old Tree.
Commissioner Carson at the left.

Overland Orchards. Same Tree Six Months Later.

or oats for hay. A small strip along the trees had been plowed and perhaps cultivated once during the season. In every instance I talked with these men who were growing wheat and oats between their young trees they assured me they cultivated their young trees well. They were men without experience, and did not realize that every particle of moisture they conserved by cultivation along the narrow strip was drawn to the growing grain and the young tree received but little benefit. A young apple or pear tree when taken from the nursery has its life shocked by its removal. When planted out in orchard—its new home—it should have every care and attention until it has recovered its vigor from the shock of transplanting. This care and attention can only be given it by thorough cultivation to conserve moisture which is so necessary to make the plant food in the soil you have planted it soluble; if not, you will have a stunted tree that will always be a reproach to your skill as a horticulturist. I say *don't* attempt to grow wheat or oats among your young trees, or old ones for that matter, for you will fail to grow a profitable orchard by doing so. Corn, beans, or potatoes can be grown among young trees as a filler crop to pay the expense of cultivation of a young orchard, if the cultivation is good, but wheat or oats never should be grown.

Our seasons here are variable. Usually we have good heavy rains during April and May, then with good or reasonably good cultivation crops or all kinds respond and are "bumpers." The past two years we have not been favored with these April and May rains. Poor cultivation or no cultivation shows a shortage in apples and other fruit that is under size. Where good cultivation has prevailed on soils of the same character the apple crop is good—of good size, highly colored, and is now selling at top prices. On the other hand, where poor cultivation has prevailed the output will be poor, apples too small to come up to grade. A careful inspection of the orchards the past month convinces me that the output of the apple and late pear crop of the Rogue and Umpqua valleys will be 33 per cent less than it should have been had the apple and pear growers given intense cultivation to their orchards during July and August. This is the condition as I know it to be, and is a subject that the progressive fruit grower should not hereafter neglect. If he does neglect it, it is only a question of time when for want of profits in his business he will have to go out of the business because he is a man that does not "do things."

Why, I was in apple orchards in Jackson County, splendid orchards too—good soil, where the cracks in the earth were a foot deep, and large enough for an apple to roll into them.

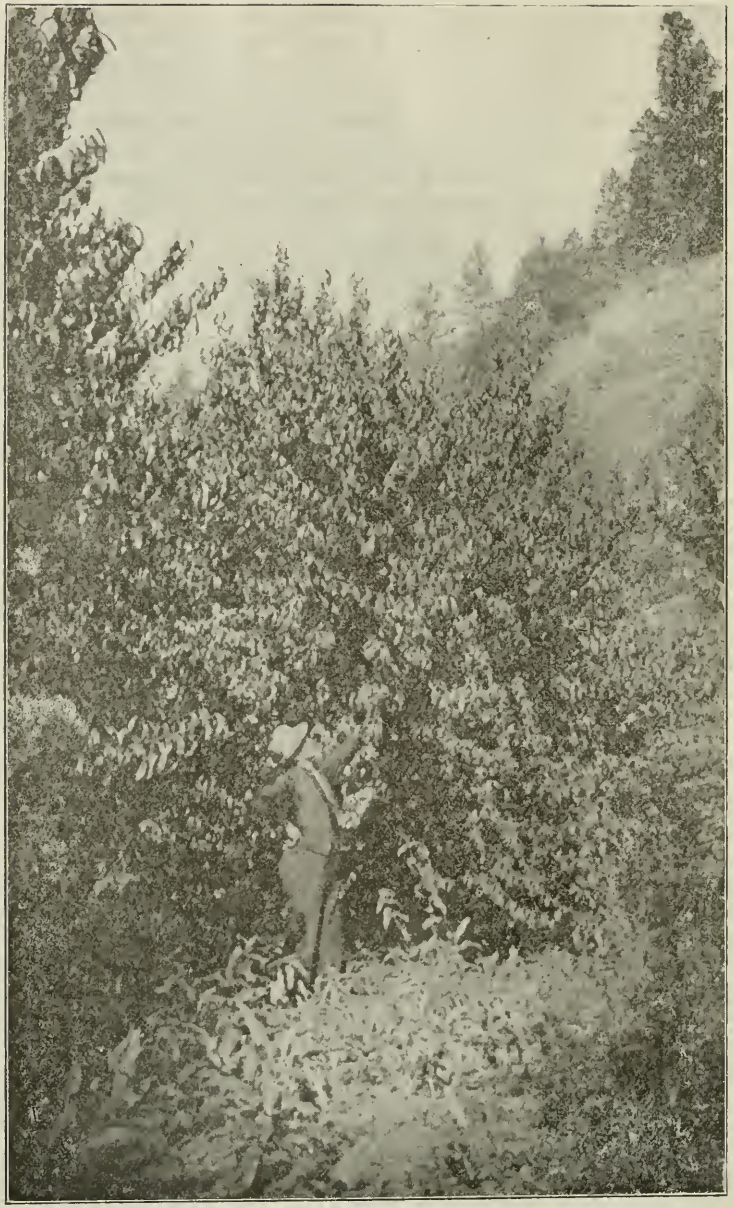
These orchards were bearing heavy crops of fruit, and yet the surface had not been cultivated and fined up enough to create a dust mulch to obliterate the cracks and conserve the moisture so necessary to mature the heavy crops of fruit they bore. The loss for want of cultivation in these orchards could not be less than one-third when an expenditure of not over two per cent of the loss in better cultivation would have been a saving of 31 per cent to the owners.

BLIGHT.

This disease that first made its appearance in the Rogue River Valley about four years ago has to a great extent been controlled in the larger commercial orchards. Orchards in which it was first discovered were treated by cutting out the twigs that were blighted and a tree-to-tree inspection made, and every hold-over (the source of annual infection) cut out, with the result the disease has been controlled and these orchards have recovered their vigor and are bearing heavy crops of fruit.

The orchards that showed the blight at first were in the hands of careful men, and the instruction as to method of treatment by Professor O'Gara were literally followed, hence their success in fighting the blight. Where the blight gets into an orchard district, as it did in the Rogue River Valley four years ago, to clean it out of that district requires the co-operation of every fruit grower in the district. It must be honest, enthusiastic co-operation of every one to clean it out and prevent loss of trees as well as fruit. It is hard to alarm average fruit growers as to the dangers of a disease whose source is a minute germ. They can see the effect of the germ, but because they cannot see the germ they attribute the result from the blight to many causes of a superstitious nature. In fact the germ theory of disease in the human family was propounded a long time before it was accepted by the medical profession. In fact, as Dr. Pickel of Medford stated recently in a lecture before the Rogue River Horticultural Society, "Thirty years ago but few among the medical profession accepted the germ theory of typhoid, tuberculosis, and other diseases of the human family, but today there is not a reputable physician anywhere but does accept it."

Dr. Pickel has made a study of the blight germ, and he says that to save a tree from the germ there is no treatment but the knife to cut out the parts that have become diseased with the germs; that there could be no spraying compound that could reach them. In this lecture of Dr. Pickel he says just what Professor O'Gara taught us about the origin of the disease and the only remedy. Dr. Pickel owns a large orchard



Rogue River Valley Peach Tree, 17 Months from Planting

in the valley. He understands the blight and its remedy, the knife. He has his men cut out the germs when first seen, and has no losses from the blight. A majority of the fruit growers now, through the educational work of Professor O'Gara and his practical demonstrations on trees that have the disease, are now controlling the blight, but not all are doing so. They reject O'Gara's teachings as to remedies, but get hold of some faker's advertisement wherein "his spraying compound has never been known to fail to rid an orchard of the blight," and believing this bosh and use the spray, with the result the trees continue to die from the germ. Several such cases occurred in the valley this year. A very valuable orchard was badly damaged by the blight. When it first started in this orchard a day's work with the knife cutting out the germs would have exterminated it. The county inspector gave the owner careful instructions how to treat it. The owner promised the inspector to carry out his instructions, but in place of doing so heedlessly sprayed his trees with a remedy recommended to cure the blight. The result of violating the instructions of the inspector and using the useless spray compound was that a good portion of the orchard was badly damaged from the blight, and a number of trees killed. In fact, the whole orchard would have been a thing of the past had not the owner sent up a distress signal, calling O'Gara and the inspectors to his aid, who at once set the men to cutting out the diseased germs and saved many trees. The result of Professor O'Gara's and the inspectors' work is that now the orchard is healthy and recovering from the blight.

Another annoying obstacle to the successful controlling of the blight is bulletins issued by some who have a theoretical knowledge of the blight, but nothing that is practical. Recently I noted a clipping in a newspaper credited to a bulletin issued by some professor, whom I do not now recall, saying it was easy to control the blight by cutting out the hold-over infection, that it was unnecessary to cut out the dead blighted terminal twigs. This professor had but little practical knowledge of this disease or else he would have emphasized the necessity of cutting back all blighted twigs, well back too, to control the blight. For two reasons he should have done so. First, it is true that in many of the blighted terminal twigs the germ dies, and in those that they do die there is no danger, but many of the twigs have moisture enough in them to keep some germs alive. With a few murky, rainy days the sap quickens and the live germs in a twig rapidly multiply, work down into the larger limbs, and develop a hold-over. So it is unsafe and poor practice to leave a single twig that has blighted for fear some of them might have a few live germs that when

conditions were right for them to multiply and then develop a hold-over for next spring's infection.

Second, any practical horticulturist would cut out the dead terminal twigs, for the reason a dead twig cannot be any benefit to the growing trees, as it absorbs some moisture from the growing tree and cannot give anything in return from being there. Then, too, it is surely an unsightly object on a healthy tree.

SPRAYING.

There is not today a fruit grower in the valley but understands the benefits derived from spraying for insect pests, and fungous diseases. Contrasting the hard work this board had to get the fruit grower to spray to protect his fruit and trees from injurious insect pests and fungous diseases with his willingness today is a gratifying proof of the value of the board's educational work to induce spraying and production of better fruit. We are now seeing the results in every section of clean fruit in our local markets. The results of spraying for the codling moth has reduced the loss from wormy fruit from 50 to 75 per cent a few years ago down to at least two per cent at present.

Spraying the peach while in foliage last spring for the peach blight with the lime and sulphur compound (one to thirty) in Ashland was unfortunate, as the trees were defoliated and the crop on the trees rendered worthless. This spraying the peach while in foliage is risky at any strength of lime and sulphur, and especially at a strength of one to thirty of the compound.

INSPECTION WORK.

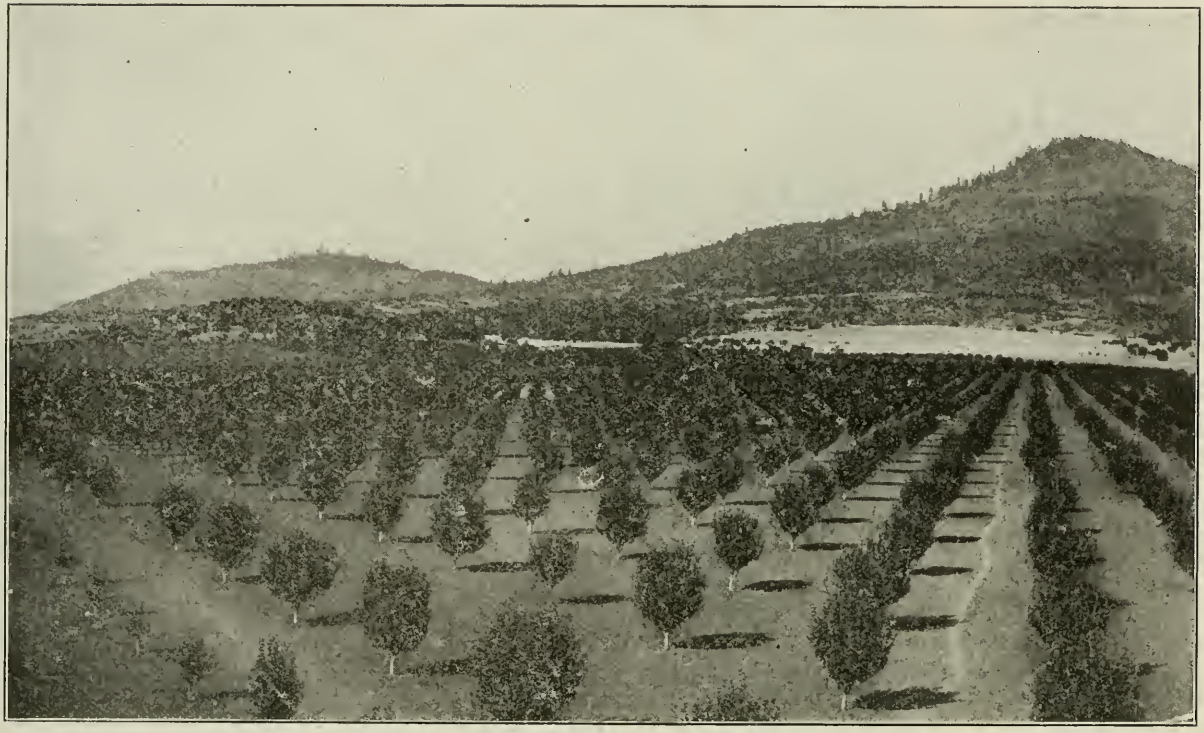
The county inspectors in Coos, Douglas, Josephine, Jackson, Klamath, and Lake have been active and have accomplished much good work towards bettering orchard conditions in these counties. Inspector P. M. Hall-Lewis, since his appointment, has proven an active, intelligent worker for better methods and conditions in Coos County; while Inspectors F. A. McCall of Douglas, J. F. Burke of Josephine, and W. J. Myers, assisted by several deputies given him by the county court of Jackson County, have done good work in their respective counties. The people of Jackson are alive to the necessity of protecting their large acreage devoted to fruit. It was found impossible for one or two inspectors to cover the orchards of Jackson, and the fruit growers of that county asked the court to appoint a number of deputies, with the approval of the commissioner, to do the police work in controlling the blight, which the court readily granted. For the past six

months we have had seven competent inspectors in that county, at an average of $600 per month expense to the county. This spirit has done much towards the success that has been had in controlling the blight in that county. During the past two years I have visited all the principal centers of the several counties of my district. I have held horticultural meetings in all the larger fruit counties, and personally visited many orchards, lectured, and made practical demonstrations as to the control of fungous diseases and insect pests.

OFFICE WORK.

As the acreage to fruit grows, the office work increases. It would not be unreasonable to say that on an average I answer five letters a day from the fruit growers from all parts of the district. They seek information on every phase of the handling of their orchards. I have distributed 800 copies of the tenth biennial report of this board, and had many requests for more than my allotment.

I have urged and advised many new people with small means not to overlook the possibilities of small fruits, such as strawberries, raspberries, etc. With water available for irrigation, the growing of two to three acres of strawberries means a good living for a family, as the market always demands a good grade of this fruit at a good profit to the grower. With water unavailable for irrigation and where gravity systems cannot be had, wells can be dug and water raised by pumping to irrigate quite large tracts in strawberries and the garden that would make it possible for the man with small means to make a good living and lay aside means to meet the cares of old age. In this climate these opportunities are here, and the man who desires to make a small and comfortable home should look these opportunities over, and not overlook them. Another source of diversity in connection with small fruit growing is poultry raising. Eggs in the local markets today at Grants Pass are 45 cents per dozen. Broilers, two to two and a half pounds weight, readily sell for 50 cents. With proper yards and daily care of poultry a small family could easily make money. I have in mind an old gentleman in this county that devotes his time to poultry (he lives 20 miles from Grants Pass). He keeps 200 hens, buys a little feed, raises much from his garden, and every ten days markets $20 worth of eggs the year around. This man's success is because he daily attends to the wants of his hens, changes their feed, and notes results. If he has a hen that fails to respond and does not lay her quota of eggs, she is sent to market. He keeps five hens in each pen, and keeps a



Hillcrest Orchard, Medford, August, 1910.

daily record of each pen's production. Method in this. What business ever paid without method as to detail?

There is a tendency in the third district to plant exery available acre to fruit that in my opinion is wrong. After the Civil War the southern states became single-crop planters. Every acre that would grow cotton was planted to the exclusion of all other crops that they needed to make a cotton crop. Their hay, bacon, flour, nearly every necessity they required to make their cotton was bought from the north. They paid heavy transportation charges for necessities that they could easily raise on the farm. The southern planters lost money until they were worked out of their single-crop system.

Will not the apple, pear, peach, and prune growers in the end lose money if they persist in planting every acre to fruit and neglect to grow hay and other necessities they have to have to grow a fruit crop? Thousands of tons of hay the past year was shipped into the third district, which the fruit growers bought at $20 to $25 per ton and hauled to their orchards to feed the stock necessary to cultivate and care for their orchards.

This system is wrong. It should be discouraged. Especially when it is possible on any fruit farm to set aside a few acres and grow alfalfa for hay that is so badly needed for the stock that cultivate the orchards. A few years ago I went to one feed firm in Grants Pass and got a statement of their imports for feed that they sold for a year to the farmers growing fruit in the county, and found that for the year it aggregated $102,000. This was only one feed firm out of several in that city. This amount of imported feed one firm sold, when it is possible to grow all the feed the county requires, and have a surplus for export. Why should the fruit growers of Jackson, Josephine, and Douglas counties pay transportation charges to the Southern Pacific for necessities that they can so easily grow with any reasonable business system?

The past year I have taken up this subject of raising on the farm the necessary feed to maintain the stock that operates the fruit farm at several horticultural meetings that I have attended in the district. I believe, if it is possible, for the success of the fruit grower that this system of one crop be discouraged.

CROP REPORTS FOR 1909-10.

There are many factors that enter into the question of fruit each year produced on a given acreage. Some years climatic conditions are so favorable that a small effort brings large production.

There are years that under adverse climatic conditions the fruit grower after the most strenuous work fails to realize his anticipations. A sufficient precipitation during April, May, and June, followed with good cultivation, insures a large output if bloom is good. During the year 1909 spring frost on low levels injured the bloom, excepting in orchards where faith was strong in the oil pots to raise temperature on frosty nights. All growers that heeded the warnings in and about Medford, phoned to every grower by Professor P. J. O'Gara, had good crops. Those who did not heed the warning lost the greater part of their crop. The same conditions as to frost prevailed during the spring of 1910. The men this year that heeded the warnings of O'Gara have good crops; those that did not, have a very light crop to sell. The experiments had in the Rogue River Valley the past two years in smudging with the oil pots convinces me that insofar as frosts are concerned the fruit grower can save his crop if he industriously uses the oil pots and keeps them burning on frosty nights. True, a warm bed on a frosty night is with many a hard thing to leave, but the results had by those who had the faith in the virtue of the oil pots should stimulate every grower to be prepared to smudge each year the necessity arises.

I am convinced that smudging to prevent spring frost from injury of the fruit bloom will become one of the details of the fruit industry, as now are spraying, pruning, etc.

The following tabulated statement will be found near the amount the several counties of the third district marketed in the years 1909 and 1910:

DOUGLAS.	1909	1910
Apples, boxes (one bushel)	30,000	60,000
Pears, boxes	15,000	25,000
Peaches, boxes	60,000	80,000
Prunes, cured (pounds)	5,225,000	7,500,000
Peaches, dried (pounds)	10,000	18,000
Strawberries, 14-cup crates	10,000	15,000
Blackberries, crates	7,000	9,000
JOSEPHINE.		
Apples	20,000	40,000
Pears	2,400	5,000
Peaches	30,000	35,000
Peaches, dried	4,000	6,000
Strawberries, crates, 15-cup	3,000	5,000
Blackberries, crates	2,500	3,000
Grapes, 30-lb. crates	5,000	8,000
JACKSON.		
Apples, boxes	230,000	430,000
Pears, boxes	100,000	150,000

Peaches, boxes	50,000	120,000
Prunes, cured, pounds	150,000	200,000
Strawberries, 15-cup crates	75,000	150,000
Peaches, dried, pounds	5,000	15,000
Blackberries, crates	10,000	20,000
Grapes, crates	800	1,000

COOS.

Apples, boxes	30,000	40,000
Pears, boxes	1,000	2,000
Strawberries, 24-cup crates	3,000	3,500
Cranberries, bushels	700	900

A. H. CARSON,
Commissioner for Third District.

Cherry Trees, Planted April, 1909; Photographed July, 1910.

REPORTS OF R. H. WEBER,

Commissioner for the Fourth District.

APRIL SESSION, 1909.

THE DALLES, OREGON, April 10, 1909.

To the Honorable State Board of Horticulture:

The winter of 1908-09 was the coldest experienced in this section for more than 20 years, and brought fears to the hearts of many fruit growers. Happily, however, the damage to the crop is not nearly so extensive as at first predicted, and is confined altogether to the peaches, for at this time cherries, apricots, pears, plums, and prunes are in full bloom, while apples give promise of a full crop.

Much planting of young orchards can again be recorded for the Fourth District for the planting season just closing. Peaches, almonds, cherries, and apricots are the leading fruits planted in The Dalles district, while at Hood River and Mosier, Newtown and Spitzenburg apples again form the principal portion of this season's planting. In the Dufur district much planting is being done, mostly of apples and pears, and this section is fast forging ahead as one of the leading fruit sections of Wasco County. A strong horticultural association has been organized by the Dufur growers, which is doing much to stimulate planting.

The Dalles growers, in addition to a strong horticultural association, have now formed and incorporated a shippers' union with a capital of $10,000. This union embraces 90 per cent of the growers, and will no doubt prove of much benefit to the large fruit interests of this rapidly growing fruit section.

Very truly yours,

R. H. WEBER.
Commissioner Fourth District.

FINAL REPORT, 1910.

To the Honorable State Board of Horticulture:

Herewith I submit my report for the term ending September 30, 1910.

The season of 1910 will go down to posterity as the banner fruit year in the history of the industry in Oregon, and especially is this true of the Fourth Horticultural District.

Fruit crops of all kinds were most bounteous this year and prices, ruling high, have brought a season of prosperity to the fruit grower never before equalled. Owing to the most favorable season ever experienced in this district, fruit of all varieties attained nearer perfection than before, and the grade therefore is far above the average of previous years, resulting in much higher net returns than the most sanguine expectations presaged.

Naturally enough, every grower had from one-fourth to one-half more fruit than he had estimated early in the season, and the resultant scramble for additional boxes and other packing material is better imagined than described. Thanks, however, to the box makers' energetic work shortages will be relieved and the crop fully taken care of and forwarded to eastern markets in due season.

All sections of the fourth district are showing enormous gains in production over previous seasons, as is evidenced by comparing the various annual crop reports, as printed in the biennial report of the State Board of Horticulture.

There is much need for a greater number of canning and preserving plants throughout the fruit growing sections of the State. These should be built and operated in every fruit growing community, and in larger districts, as for instance the Hood River Valley, they should be located in several community centers, where they would be most easy of access, so that culls and over-ripes which at present are practically a total loss, could be cheaply and quickly delivered, and converted into cider, vinegar, preserves, jams, or pie fruit, thus increasing the net profits of the orchard considerably by utilizing the by-products and saving the waste.

Much encouragement should be given to local fruit fairs, and to the several district fairs where fruit is invariably exhibited and where a keen rivalry is created among the growers, and every year sees great improvements in quality and pack. From these smaller local and district exhibits could then be selected the best for display at the Oregon Horticultural Society exhibit, where the display of a much larger quantity of fruit should be encouraged than has been the case in the past. At this show all sections of the State should have exhibits, to encourage which more liberal prizes should be offered as an inducement to bring out larger displays.

Orchard planting shows no abatement in this district, and instead of diminishing seems rather on the increase, for new plantings are contemplated everywhere. Land is being cleared as fast as men and machines can remove trees and stumps, and much virgin forest is being removed to make room for the more-profit-bearing orchard trees, and many hundreds of

the thousands of acres of available fruit land will be converted into orchards between now and the spring of 1911.

The principal fruit producing sections in this district remain much as formerly, namely: Hood River, Mosier, and The Dalles, with Dufur knocking loudly at the door of the hall of fame, where she is duly entitled to admission. Considerable fruit is already being shipped from this point, and with the many young orchards recently set out, once in bearing, many carloads of apples and pears will be shipped to eastern markets. While Wasco and Hood River counties are admittedly the greatest fruit producers of the Fourth Horticultural District, there are many sections in all the other counties comprising this district where splendid fruit can be grown. This fact was fully demonstrated, especially by Gilliam and Wheeler counties at their district fair recently held at Mayville, where large quantities of apples, pears, prunes, plums, and grapes were shown, and among them were some splendid specimens, indeed as fine as could be found anywhere. In this section little or no spraying is done, and yet the fruit was remarkably clean, showing neither signs of scale nor codling moth, and while there are at this time few if any commercial orchards in these counties, principally due to lack of transportation, it would not be a far guess to say that with the advent of railroads many new orchards would be started.

Hood River, as usual, is again in the lead with quantity and value of crop, being far in the lead of all competing sections in this district, due to the energy of her progressive citizens, who early recognized the advantages of fruit growing in the northwest, and are therefore now reaping the just rewards due them as pace-makers for the rest of this part of Oregon in the fruit industry.

That the fruit industry in the fourth district is in a prosperous and healthy condition will be readily gleaned from the following crop report, which for convenience sake is given in districts, showing exact quantity produced. A comparison of these figures with those of previous reports will easily convince all who take the pains to read them that the industry is not dead; that it is not even asleep, but very much alive and growing like—well—as fast as could be expected under the circumstances; but not as fast as we would if we had a few millions of people of the surplus from eastern states, for whom we could find plenty of room and work with insured prosperity:

HOOD RIVER.

Apples, boxes	650,000
Pears, boxes	10,000
Cherries, boxes	5,000
Strawberries, crates	65,000

Prunes, crates	4,000
Blackberries, crates	2,500
Raspberries, crates	1,000

MOSIER.

Apples, boxes	30,000
Pears, boxes	1,000
Prunes, boxes	16,000
Plums, boxes	5,000
Cherries, boxes	6,000
Peaches, boxes	2,500
Apricots, boxes	1,000
Strawberries, crates	3,000

THE DALLES.

Apples, boxes	24,000
Pears, boxes	38,000
Prunes, boxes	100,000
Plums, boxes	15,0
Peaches, boxes	150,000
Apricots, boxes	10,000
Strawberries, crates	6,000
Raspberries, crates	800
Blackberries, crates	1,500
Cherries, tons	500
Grapes, tons	300

R. H. WEBER,
Commissioner Fourth District.

REPORT OF JUDD GEER,

Commissioner for the Fifth District.

To the Honorable State Board of Horticulture:

I herewith submit my report as Commissioner of the fifth district for the year ending September 30, 1910.

The fifth district embraces the counties of Umatilla, Union, Wallowa, Baker, Grant, Malheur, and Harney, with a total area of approximately 35,000 square miles. To cover the entire district once a year and visit all of the fruit growing sections is practically impossible on my allowance of the money appropriated by the State.

The advent of the railroad into Wallowa County has opened up a great fruit growing section, and Wallowa County will be heard from from a horticultural standpoint in the near future. I had the pleasure of visiting the Wallowa County fair a few weeks ago. Of course I expected to see fruit, but I was astounded when I looked at the apples, peaches, grapes, etc. There were all of the well known varieties and a great many of the newer ones, and not infrequently one would see a fine plate of Gano labeled King of Tompkins County, or *vice versa*. But experience will soon overcome all of that. Although the larger valleys of the county have an over-abundance of water for irrigation purposes, there are large bodies of land on the surrounding hills where dry farming is practiced, and from these sections with the driest season the county has ever known, I saw some as fine exhibits of fruit of all varieties as are grown in the State.

Umatilla County perhaps ships more fruit than any other county in the district. The Freewater-Milton district lies in one of the best fruit growing sections of the famous Walla Walla Valley. At Freewater there is a strong organization of fruit growers, and a good part of the fruit grown there is handled through the union, and the successful manner in which the crop was handled this year puts it on a firm foundation.

The western part of Umatilla County is practically new to fruit growing commercially. It is mostly what is known as the arid lands, and it is only in the last few years that they got water on these lands. Now there are thousands upon

Turpenning Walnut Grove, Lane County. Inter-planted with corn. Photographed July 10, 1910.

thousands of trees planted and being planted, and it will be but a few years until it will be known as one of Oregon's best fruit raising sections.

Union County is another of Eastern Oregon's large fruit growing counties. This county is known by the medals it takes at all the world's expositions and national apple shows. The young orchards in the northern end of the county known as the Imbler and Elgin sections where large commercial orchards of from 40 to 200 acres have been planted in the past few years, some of the older orchards are beginning to bear and in a personal letter from Geo. L. Cleaver who is now in Iowa to F. R. Bridges of La Grande, Mr. Cleaver says that he has just sold a carload of Cleaver-Bridges crop, grown at Imbler, at $2.50 per box. This is perhaps the largest price that a carload of apples from here has received in several years, and indicates that this valley is able to vie with any other apple growing section in the world.

Malheur County comes under the head of what is known as an irrigated district, and for fruit growing, stock raising, and alfalfa hay is one of the leading counties of the fifth district.

Baker County is divided into three distinct valleys—Eagle and Pine in the eastern part, and the Baker Valley in the west or central part. Baker Valley is a light clay loam and on the western side is irrigated and subirrigated by numerous streams and springs, while the eastern side is irrigated from large ditches and reservoirs, and on account of the higher altitude raises apples, cherries, pears, peaches, etc., of unsurpassed flavor and keeping qualities. Eagle Valley is perhaps one of the finest valleys for its size in the entire northwest, and can raise anything in the fruit line that is grown in the Pacific northwest. Pine Valley is separated from Eagle by a range of hills and is some five or six miles distant, with a gradual slope to the east of about ten miles to Snake River. Both of these valleys have just come into connection with the outer world by railroad facilities.

Grant County though exporting but a small quantity of fruit up to this time has some very fine orchards, and there will be a great many more planted in the near future as they raise fruit of excellent quality.

With Harney County I am unacquainted personally, but have seen fine samples of fruit, grain, etc., from there, and it is only a question of a short time until they will have railroad transportation, when it will become one of the leading counties of the State.

There is no doubt about the fifth district being one of the best fruit sections in Oregon, and I know that we can grow anything that can be grown in the northwest, but the growers

must learn one thing before they can expect to establish a reputation on the market, and that is that their fruit must be packed fairly and squarely according to its merit and in the most attractive manner possible. Some growers seem to think that if their product is good enough for them it is good enough for the purchaser regardless of the quality and the fairness of the pack. Such growers can keep up that practice till doomsday, but they will find outside markets against them just as long as they persist in letting nature handle and attend to everything.

The fruit crop of the district for the year 1910 has been approximately as follows:

UMATILLA COUNTY.

	Carloads.
Apples	600
Pears	35
Fresh Prunes	90
Peaches	210
Cherries	20
Plums	25
Strawberries	40
Grapes	10

UNION COUNTY.

Apples	430
Pears	8
Fresh Prunes	45
Peaches	10
Cherries	30
Plums	15
Strawberries	5

MALHEUR COUNTY.

Apples	25
Pears	5
Fresh Prunes	15

BAKER COUNTY.

Apples	30
Pears	5
Fresh Prunes	10
Peaches	15

GRANT COUNTY.

Apples	20

JUDD GEER,
Commissioner Fifth District.

SPRAYS AND SPRAYING

Prepared for this report by Prof. A. B. Cordley, Entomologist of the Oregon Experiment Station, pursuant to a resolution adopted by the Oregon State Board of Horticulture.

Knowledge of a multiplicity of sprays is not essential to success in spraying. Equipped with an understanding of the range of usefulness of three or four standard sprays, with a good spray pump, and with a determination to do thorough work, one is as well fortified as may be against most orchard pests. Therefore this article will be brief. In practically all of the orchard spraying done in this State but three kinds of spray are used, and probably one of these may soon be largely dispensed with. To treat of more is but to waste time and space and to lead to confusion.

Most growers now understand that spraying is primarily to prevent loss from insects and from fungous diseases, and that a spray which is effective against one pest may be totally ineffective against another. Still, for the benefit of the novice, it may be necessary to emphasize the fact that there is no cure-all. Poisons like arsenate of lead or paris green are used to destroy codling moth and other insects which actually swallow plant tissues—usually caterpillars and beetles which feed upon leaves. They have little or no value as fungicides and are not effective against San Jose scale, plant lice and other sucking insects. Borderaux mixture is used to *prevent* attacks of fungous diseases and has but little value as an insecticide. Lime-sulphur is both an insecticide and a fungicide. Its range of usefulness is therefore greatly increased, but it is not a cure-all.

As intimated above, the three principal sprays in use in this State are arsenate of lead, Bordeaux mixture, and lime-sulphur solutions.

ARSENATE OF LEAD.

Arsenate of lead is now the chief poison used in spraying for the codling moth, although paris green is cheaper and gives approximately as good results. Many brands of commercial arsenate of lead are now to be had, and so far as our observations go all are reasonably pure. The various brands may, however, be arranged into two definite groups which may be termed the acid arsenates and the neutral or normal arsenates. While the evidence is not conclusive, it appears to be true that

the acid arsenates have some tendency to injure foliage and that they cannot so well be used with the lime-sulphur solutions as can the neutral arsenates. While the available evidence upon the above points is not sufficient to justify one in condemning the acid arsenates, growers are advised to use neutral arsenates wherever possible.

Most manufacturers advise the use of three pounds of arsenate of lead to 50 gallons of water. The Washington Experiment Station has demonstrated that in the dry climate of Eastern Washington one pound to 50 gallons gives equally good results in controlling codling moth. We have found that two pounds are sufficient in the Willamette Valley. It is quite probable that one pound may be sufficient here, but since this has not been demonstrated we think it best to advise two pounds to 50 gallons for the more humid portions of this State.

Some growers prefer to prepare the arsenate of lead as it is used. This is but little if any more troublesome than to mix the prepared arsenates in water and should be somewhat cheaper. It can be readily prepared after the following formula:

Arsenate of soda	4 ounces
Acetate of lead	11 ounces
Water	15 to 20 gallons

Dissolve the arsenate of soda in two quarts and the acetate of lead in four quarts of warm water. When dissolved add them to the required amount of water.

This formula is especially valuable for spraying very delicate foliage or for use against insects which are killed only by large amounts of poison, since it can be used upon plants in much stronger solutions than the other food poisons without injury to the foliage.

If it is desired to use a combined insecticide and fungicide, arsenate of lead may be added to Bordeaux or to lime-sulphur solution in the same proportion as when water is used.

BORDEAUX MIXTURE.

Bordeaux mixture has been the principal preventive of fungous diseases. It is of some value as an insecticide, has a beneficial effect upon plants independent of its effect upon their insect and fungous parasites and may be used for most purposes in place of water in the preparation of the arsenical sprays.

Bordeaux for winter use may be made as follows:

Copper sulphate	6 pounds
Quick lime	6 pounds
Water	50 gallons

This is known as the 6-6-50 formula. It should be used only upon dormant trees. When the trees are in leaf the following 4-6-50 formula is used:

Copper sulphate	4 pounds
Quick lime	6 pounds
Water	50 gallons

For spraying peach foliage it is best to use the still weaker 3-6-50 formula:

Copper sulphate	3 pounds
Quick lime	6 pounds
Water	50 gallons

To prepare Bordeaux mixture dissolve the copper sulphate in hot or cold water in a wooden or earthen vessel. Slake the lime, using only sufficient water to insure slaking. The lime should not be allowed to become dry while slaking nor should it be submerged in water. After the lime is slaked add water and stir until the "milk of lime" is of the consistency of cream. The best results are obtained by diluting the milk of lime and the copper sulphate solution each to 25 gallons and then pouring these two dilute solutions together. The lime solution should always be strained through a sieve to exclude particles that might clog the nozzles. A brass wire sieve, 20-mesh, large enough to fit the head of a barrel or the opening of the spray tank, will prove a great convenience.

When large quantities of Bordeaux are required, it is most convenient to make stock solutions of lime and of copper sulphate of known strength. A convenient stock solution of copper sulphate is made by dissolving 100 pounds in 50 gallons of water; one of lime, by slaking 100 pounds and diluting with water to 50 gallons. Each gallon of the stock solutions will then contain two pounds of lime or of copper sulphate and the amount to be used in preparing any quantity of Bordeaux according to the above formulas can be readily computed.

If sufficient lime has not been used, or if that used was of inferior quality the Bordeaux may injure the foliage or may cause a "russetting" of the fruit. It is, therefore, always best to determine whether enough lime has been used by testing the mixture.

TESTING BORDEAUX.

There are three simple tests which may be used. First, hold a clean, bright knife blade in the Bordeaux for at least one minute. If it becomes copper-plated more lime should

be used. Second, pour some of the Bordeaux into a shallow dish and holding it up to the light blow gently across its surface. If properly made a thin pellicle will form on the surface of the liquid. Third, dissolve one ounce of ferrocyanide solution. If sufficient lime has been used no change will be noticed. If a brownish-red discoloration takes place, more lime should be added.

Unfortunately, even the most carefully prepared Bordeaux will sometimes cause serious "russetting" of the fruit. This russetting seems to be most serious when rainy or at least humid weather prevails at the time of the first spraying after the blossoms fall, and as such conditions do usually thus prevail, at least in the Willamette Valley, "spray injury" following the use of Bordeaux often becomes almost as serious as the fungous injury it was expected to prevent.

LIME-SULPHUR SOLUTION.

It is often desirable and practicable to use sprays which combine both fungicidal and insecticidal qualities. The time, expense, and annoyance of one or more sprayings may frequently be eliminated by such combinations. Thus Bordeaux mixture and Paris green, or arsenate of lead, has long been used as a combined spray for apple-scab and codling moth and the expense of controlling these two important apple pests has thereby been materially reduced. This spray, however, combines only the fungicidal value of Bordeaux and the food poison value of the arsenical. It is of little or no value as a contact insecticide—in other words it is of no value against scale insects, plant lice and the numerous insects which belong to Group II.

During the past five years we have conclusively demonstrated that the lime-sulphur spray, which has long been known as the most satisfactory winter spray for San Jose scale, has fungicidal qualities nearly or quite equal to those of Bordeaux. We have also conclusively demonstrated that it may be used in combination with arsenate of lead without materially detracting from the value of either; and that when so used it is at once an efficient contact insecticide, food poison spray, and fungicide.

It has also the advantage that when properly diluted it may be used either as a winter or summer spray.

As a winter spray one application of lime-sulphur spray each year will do more for the neglected orchard than can be done in any other way by the same expenditure of cash and energy. If not only destroys San Jose scale, but it also destroys the branch form of woolly-aphis, the eggs of the green-aphis, the pear-leaf blister mite, the hibernating larvæ

of the prune twig-miner, probably the hibernating larvæ of the bud-moth, together with most other insects which may chance to be wintering upon the trees. It is also a good fungicide. If applied in fall it is nearly or quite equal to Bordeaux as a preventive of apple-tree anthracnose; applied to peach trees just before the buds open in spring it is a preventive of peach-leaf curl.

As a summer spray the results of the past five seasons' work at the Oregon Experiment Station prove conclusively that when properly diluted it can be safely used upon the apple, pear, plum and prune, potato, celery and other hardy plants, and that it gives better results in controlling apple scab than does Bordeaux, which has been the standard spray for this disease, and further that it does not produce the disastrous "spray injury" to the fruit which is so common and often serious when Bordeaux is used.

There are two methods of preparing the lime-sulphur spray. The formula which has been most generally used in this State is as follows:

Quick lime	50 pounds
Sulphur	50 pounds
Water	150 gallons

Slake the lime thoroughly, add the sulphur, and boil briskly for at least an hour or until the mixture is of a deep blood-red color with but little free sulphur on the surface. Add water to make 150 gallons. Apply with considerable force through a coarse nozzle.

The "stock solution" method which is now most generally used in this State has been developed during the past three years. During that time there have appeared upon the market a number of concentrated lime-sulphur solutions, which have only to be diluted with water to be ready for use. Careful experiments extending over three seasons have demonstrated that these sprays are fully equal to the old home-made lime-sulphur spray in destroying San Jose scale. Whether all of them can safely be used for summer spraying is yet to be demonstrated.

The chief fault to be found with these commercial preparations is that they cost too much. The retail price is $9.00 to $12.00 per barrel of 50 gallons. The lime and sulphur necessary to prepare 50 gallons of stock solution which is equally as efficient costs at present retail prices approximately $3.00. It may be prepared as follows:

Sulphur (best finely ground) one sack	110 pounds
Lime (best grade, unslaked)	55 pounds
Water, sufficient to make	60 gallons

Slake the lime, mix the sulphur into a thin paste with a little water, add it to the lime, add sufficient water to make 60 gallons, bring to a boil and boil vigorously for 30 to 45 minutes. The sediment is then allowed to settle, after which the clear dark amber-colored liquid is drawn off and may be stored in casks for future use.

Every grower who expects to prepare his own spray by the stock solution should provide himself with a Beaume's Acid Scale Hydrometer. Such an instrument, which should not cost over $1.00, furnishes a very simple and convenient method of testing the strength of the solution. A "stock" solution prepared as above described should test approximately 30 degrees upon such a scale.

If the grower be provided with a hydrometer, it is not at all necessary to obtain stock solutions of uniform strength. The following table gives the proper dilution to be used with stock solutions of various degrees of density, both for winter and summer spraying:

Stock Solution Baume Scale—Deg.	*Dilution Winter Strength.*	*Dilution Summer Strength.*
32	1—12	1—32
31	1—11	1—31
30	1—10	1—30
29	1—9 ½	1—29
28	1—9	1—28
27	1—8 ½	1—27
26	1—8	1—26
25	1—7 ½	1—25
24	1—7	1—24
23	1—6 ½	1—23
22	1—6	1—22

KEROSENE EMULSION.

Kerosene oil, or coal oil, is a powerful insecticide. The undiluted oil is, however, liable to seriously injure plants to which it is applied. This difficulty is overcome by using one of the special spray pumps which have been devised for the purpose of mixing the oil with water in any desired proportion; or by forming an emulsion with some substance that may be readily diluted with water. Soap is most commonly used for this purpose, as follows:

Kerosene oil	2 gallons
Hard soap (preferably whale-oil)	½ pound
Water	1 gallon

Dissolve the soap in the water by boiling. Add the suds, boiling hot, to the oil. Churn the mixture violently with a spray pump until it becomes a thick, creamy mass. If per-

fectly emulsified, the oil will not rise to the surface even after standing an indefinite time. Such an emulsion may be used immediately or may be kept as a stock mixture. Before using dilute one part of the stock emulsion with ten to fifteen of water.

This will be found to be an efficient remedy for green aphis, woolly aphis, red spider, mealy bugs and certain scale insects.

WHALE-OIL SOAP AND QUASSIA.

Strong soap suds made from any good soap are useful for destroying soft-bodied insects like plant-lice. It is usual, however, to employ for this purpose special soaps made with fish-oils, and sold as whale-oil soaps. These vary considerably in composition, some being made with soda, others with potash lye. The latter are much superior and buyers should insist on having potash soaps.

For scale insects, whale-oil soap is sometimes used in as concentrated a solution as two pounds of soap to one gallon of water, but only upon dormant plants. As a remedy for the various plant-lice one pound of soap to eight or ten gallons of water is usually sufficient. Hop growers are inclined to believe that better results are obtained, when spraying for hop-lice, by adding some quassia decoction to the soap solution, as follows:

Whale-oil soap	10 pounds
Quassia	5 pounds
Water	100 gallons

Place the quassia chips in a sack, cover with eight or ten gallons of water and soak twelve to twenty-four hours. Then bring to a boil, remove the chips, add the soap and boil until it is dissolved. Add water to make 100 gallons. The whale-oil soap and quassia spray is used principally by hop growers.

BLACK LEAF SHEEP DIP.

Black leaf sheep dip, a proprietary tobacco preparation, may be used for the same purpose as kerosene emulsion or whale-oil soap and quassia and has the advantage that it does not injure foliage and is ready for use. One gallon diluted with 75 to 100 gallons of water makes a very efficient aphidicide.

WHEN TO SPRAY.

General directions as to how many times to spray and when the applications should be made are at best unsatisfactory. The answer to both questions depends not only upon the variety of fruit to be sprayed, but also upon the conditions pre-

vailing in the orchard to be sprayed, and the relative importance of the orchard crop to other crops. The orchardist can afford to do more spraying than can the farmer.

An almost universal practice in this State—and a good one—is to spray the orchard, whatever the kind of fruit, with lime-sulphur at some time while the trees are dormant. While this application is made primarily for San Jose scale, I believe there is no other which has such a generally beneficial result. It is the annual "house-cleaning" of the orchards.

The best time for this winter spraying is immediately after the leaves drop in fall—even before they are all off—or just before the buds open in spring. Personally, I prefer the latter, but attention should be called to the danger of unfavorable weather conditions at that time and to the consequent inadvisability of delaying the work too long.

All other sprayings are for special purposes and can best be considered in connection with particular pests.

APPLE.

APPLE SCAB.

Spray with Bordeaux or with lime-sulphur (1-20): first, when the blossoms are beginning to unfold; second, immediately after the blossoms fall; third, ten days or two weeks later. (If the trees were sprayed with winter strength lime-sulphur solution before the buds started, the first of the above applications may be omitted. If prolonged rainy weather follows the third spraying, a fourth two weeks later may be profitable.)

CODLING MOTH.

Add arsenate of lead or paris green to the second scab spray. Endeavor at this time, by the most thorough work, to fill the blossom end of every apple with the spray. If this be well done, and if the fruit be again thoroughly sprayed late in June, fairly good results may be obtained without further applications. It is our experience, however, that in the Willamette Valley at least, it usually pays to spray once or twice for the second brood. The first of these applications should be about August 1; the second some three of four weeks later. While thorough work should be done at all times particular emphasis should be placed upon the two first sprayings. If all of the first brood larvae could be killed there would be none of the second.

SAN JOSE SCALE.

Spray in winter with lime-sulphur, either immediately after the leaves fall or before the buds start in spring. Do thorough work. Soak every part of the tree.

APHIDS OR PLANT LICE.

(*Woolly-aphis, Green-aphis, Brown-aphis, Black-aphis.*)

The plant lice rarely if ever become troublesome in orchards which receive an annual winter spraying with lime-sulphur. Dilute kerosene emulsion or black-leaf sheep dip applied just after the leaf buds start or at any time the aphids become troublesome, is also effective.

APPLE TINGIS.

Practice clean culture, clean up and burn all rubbish about the orchard. Spray when eggs are hatching in late May or early June with kerosene emulsion or black-leaf sheep dip.

APPLE TREE ANTHRACNOSE.

Spray with Bordeaux or lime-sulphur soon after fall rains begin or at least as soon as fruit is picked. Spray again with lime-sulphur as soon as leaves have fallen.

CHERRY.

SHOT-HOLE FUNGUS.

Spray with Bordeaux or lime-sulphur when blossoms are opening, and again when petals have fallen.

CHERRY SLUGS.

Spray with arsenate of lead whenever they become troublesome.

BLACK APHIS.

See under "Apple."

SAN JOSE SCALE.

See under "Apple."

CHERRY GUMMOSIS.

No satisfactory remedy known. The best that can be done is to prune and burn dead branches, cut out gum-pockets and wash or spray wounds with Bordeaux.

BROWN ROT.

See under "Peach."

PEACH.

PEACH LEAF CURL.

Spray thoroughly before buds open with Bordeaux or lime-sulphur.

PEACH BLIGHT.

Spray with Bordeaux or lime-sulphur soon after fall rains begin or immediately after late fruit is gathered.

PEACH FRUIT SPOT.

Spray same as for blight. Also spray once or twice in late May and June with weak Bordeaux or lime-sulphur. Do not make these applications during rainy weather.

BROWN ROT.

Destroy all rotting fruit. Spray as for blight. If disease still persists spray with dilute lime-sulphur when fruit is ripening.

SAN JOSE SCALE.

See under "Apple."

PEAR.

PEAR SCAB.

See under "Apple Scab."

CODLING MOTH.

See under "Apple."

SAN JOSE SCALE.

See under "Apple."

PEAR SLUG.

See under "Cherry Slug."

PEAR BLIGHT.

This is the most destructive disease of the pear; it also attacks the apple and other related trees. Extreme care and thoroughness are necessary in dealing with this disease. Examine trees carefully and repeatedly during the winter and cut out and burn every particle of hold-over blight that can be detected. Examine not only branches but trunk, and even roots. Sterilize tools frequently with solution of corrosive sublimate.

PEAR-LEAF BLISTER MITE.

Spray with lime-sulphur just as buds are starting.

PLUM AND PRUNE.

BROWN ROT.

See under "Peach."

SHOT-HOLE FUNGUS.

See under "Cherry."

SAN JOSE SCALE.

See under "Apple."

APPENDIX

MARKETING FRUIT

By Hon. W. K. Newell. *President of State Board of Horticulture.*

The question of most vital importance that now confronts the fruit growers of Oregon is that of marketing. Situated as we are at a great distance from the large cities of the eastern states and Europe, and producing a large surplus that must be exported, the matter of reaching these markets at a profit is a serious one. There is unquestionably a market for our fruit if we can find it and reach it, a price that will not be prohibitive to the consumer.

Statistics show an immense falling off in the production of apples in the United States; the crop of 1896 was 67,000,000 barrels while that of 1909 was only 22,735,000 barrels, and the present year only very slightly in excess of last. while the population has increased from 70,000,000 to 90,000,000. Instead of showing this surprising decrease of production and consumption, the apple industry should show a growth commensurate with the increase in population. At a time when all food stuffs have been increasing in price, the attention of the consuming public should have been turned more sharply to the food value of apples.

President Howard Elliott, of the Northern Pacific R. R., in an address delivered at the opening of the Spokane apple show is authority for the statement that "apples compare very favorably with bread, dried beans and similar articles of food in the total amounts of food material present, and that it is a source of energy rather than of tissue forming material. Very careful experiments have been made and show that ten cents worth of fresh apples used as food furnishes 1467 units (calories) of energy to the body; ten cents worth of porterhouse steak furnishes 441 units (calories) of energy; ten cents worth of dried beans furnishes 892 units (calories) so that in general, it may be said that the apple furnishes a wholesome, palatable and very attractive addition to the food supply of the family; and the increasing production of the apple should help to offset the growing price of meat and other forms of food."

Horticultural societies and kindred organizations should take steps to spread such knowledge in a way to reach the consuming public in a forcible manner.

Although it may be truthfully said that Oregon leads the way in methods of marketing and that we are far better organized than are the growers of any other fruit section, still it must be confessed that we are far from being organized as we should be. At present we are attempting to market a great quantity of fruit of a class that should never be placed upon the market in the fresh state, and we are crowding upon the market in one or two months time a supply that should be distributed over six or eight months.

The fruit-consuming public demands, and is certainly entitled to have, a fruit that is at least reasonably sound, well colored and free from insect injuries, and in a clean, attractive package, if it is to pay prices that are remunerative to the grower.

The markets are getting more and more particular each year as to the quality of the fruit and the attractiveness of the package, and

Thinning Apples.

nothing pays better than to cater to this demand for the best. Even the most careless grower has some good fruit and it will be money in his pocket to pack and sell that little by itself. A prominent eastern horticulturist who came out here to learn our methods went home and said, "that the western growers had learned that two good apples are worth more than two good apples with two poor ones thrown in." This is undeniably true even if we have not all learned it yet.

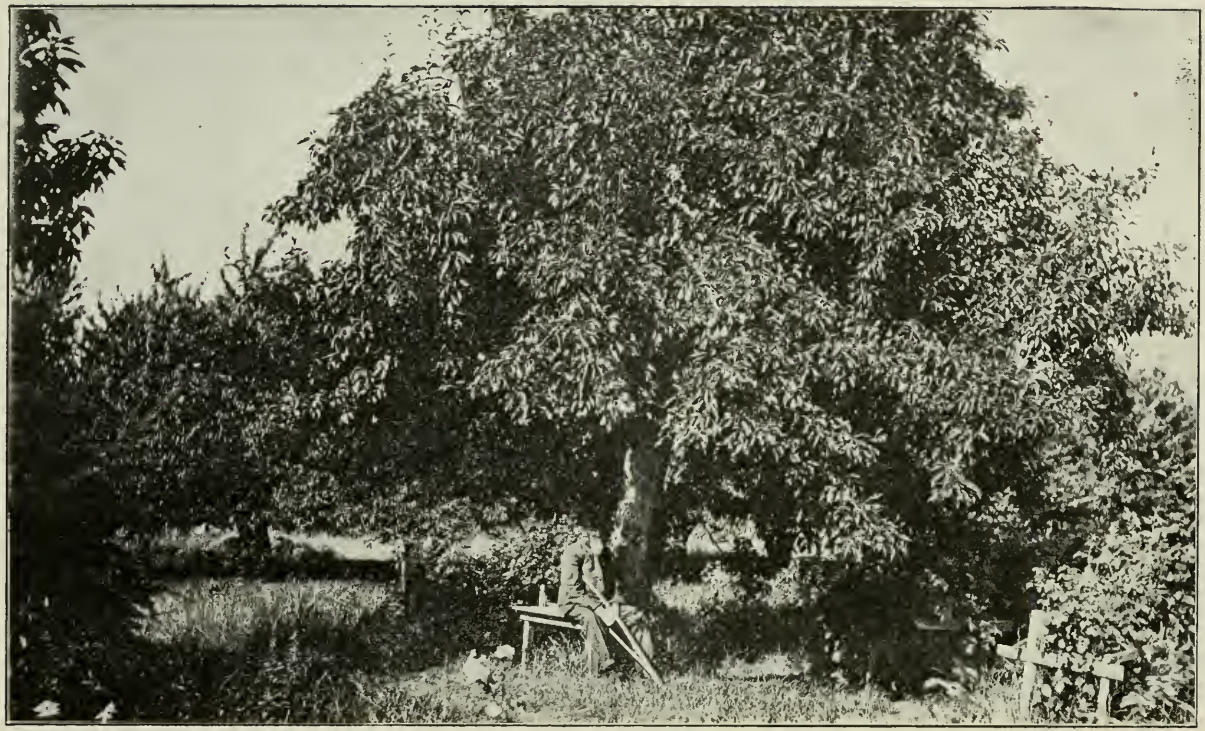
It is not alone the waste of time and material in packing but it means the demoralization of our markets to dump great quantities of stuff on the market that should have gone to the cannery, evaporator, cider mills or the pig pen. That is the trouble with the local markets at the present time; there is so much poor stuff being offered at a low price that there is not a healthy, active demand for good fruit.

We must have more facilities for utilizing the fruits that are not fit for the market in the fresh stage. Every fruit growers' union must provide itself with a canning and evaporating plant with cider presses and vinegar tanks and a cold storage warehouse. Then the fruit can be graded as it comes in and handled accordingly: if prices are right, the best can be placed upon the market, and the overripe and culls be canned, dried or made into vinegar as its condition will warrant. If advisable the cold storage warehouse will furnish storage while waiting for prices to adjust themselves. We simply must be in shape to take care of all the crop, so that none shall be wasted, nor any unfit fruit be forced upon the market for lack of other means of disposing of it. And we must be able to store and hold our fruit if the markets are not in good condition. At present we are too much at the mercy of the buyers; every well informed grower knows that apples should be bringing better prices and meeting with readier sale than they are at present, but many of the large dealers lost money last year, so they claim, in buying, and this year have industriously peddled stories of great yield, over-production, etc., and have refused to buy heavily, knowing that the growers had not facilities for storing and must force the crop on the market. If ever we are to have anything to say as to the prices our fruit shall bring, we must be able to control it until the consumer is ready for it.

The success of the fruit industry of the Northwest for the future depends entirely upon the way in which we meet and solve this question of marketing. We can produce the fruit and will produce it in ever increasing quantities, provided it can be sold profitably. Manifestly it is beyond the ability of any grower, local dealer, or local fruit union to reach out very far in the development of new markets, or of increasing our sales in our present markets. At present the different districts of the Northwest, whose interests are identical, as our export fruits must reach the same markets, are competing with each other instead of cooperating as they should do to prevent the glutting of certain markets, and the ruinous cutting of prices. The Northwest Fruit Exchange recently organized in Portland is working along the right lines and has been of great benefit this year in the working up of new and untried markets. This movement must be perfected and controlled more exclusively by the growers.

We have much to learn from the orange growers of California who have organized their business so well that oranges are found on sale in the most remote crossroads villages all over the land, and their fruit is the most stable in price of any on the market. In addition to their well organized central selling agency, they have recently established an orange auction sales department at Los Angeles where oranges are sold daily to the highest bidder. This plan is said to be working extremely well.

We must have a strong local union at every shipping point in the Northwest, which union shall have absolute and exclusive control of



Clairgeau Pear Tree at Eugene.

the grading, packing and selling of every pound of fruit produced by its members. Absolutely uniform rules for grading and packing must be followed by each and every union, and then a central selling agency can be maintained which can handle the sales for all. The selling will be a simple matter when the control is all in strong hands and when they can absolutely guarantee the contents of every package that they offer. They can reach out until every market in the world is at our command. We must follow the methods that have made the German manufacturers so wonderfully successful, that have enabled them to so far distance their English and American competitors in so many foreign markets; that of sending out their best salesmen to hunt far and wide for markets and to find just what that market wanted; the style and price of goods and how they wanted it packed, the terms of payment and everything in the remotest way connected with the deal. The English and American way has too often been to send just what they were manufacturing or what they couldn't sell at home, or what they thought the foreign market ought to want, and let it go at that.

Every market has its peculiarities that must be learned and catered to even though they may seem trifling to the shipper. It is expensive business trying to educate the public taste to take something it is not accustomed to. Let us give them the kind of fruit they want, if possible; failing that, it is time to try to induce them to take what we have. New York has been so long accustomed to getting all its supply of the cheaper grades of apples in barrels that it is absolutely useless to ship anything but the largest and fanciest fruit there in boxes, and they want red fruit in preference to yellow. Many of the English markets prefer the yellow apples and the smaller sizes. The dealers in Baltimore and Washington have for generations sold fruit by the peck and the box or barrel is carefully sized up as to how many pecks it will measure out. Some day the consumers in those cities may learn to buy apples by the box or the dozen, but in the meantime let us give them fruit that they can retail by the peck or half peck. One of the most successful politicians this country has ever produced, once said that he never tried to force a policy nor a candidate on an unwilling public, but that he always studied their wishes and tried to meet them. Such a policy is just as successful in business as in politics.

It scarcely seems necessary to cite any more arguments in favor of local associations at every shipping point, the need is so obvious, yet the advantage of uniform grading might be further noted. With all the fruit under one control it is possible to sell ahead and to sell in straight carloads of whatever variety, size and grade the purchaser wishes. It is true that sometimes a mixed car can be sold as readily as a straight one, but ordinarily not. Take a mixed car with five to ten varieties and three grades, the bulk of them may be all right in one market, but on the others the buyer may insist on heavy discounts because they are not suitable for his trade. On the other hand, this same car in some other market might prove to be desirable in the opposite varieties and undesirable in the others, so in order to get top-notch value for every variety shipped, they should be shipped in straight cars. The same rule applies to the shipment of mixed grades: it is much better to ship the choice and fancy grades separately.

There has been great confusion regarding this matter of grading; we have had "Fancy," "Extra Fancy," "XXX Fancy," "Choice," "Choice No. 1," "Choice No. 2," and so on, according to the "fancy" of the packer, until the terms had ceased to have any real meaning to the buyer. As the result of a conference held at the Spokane apple show last year the matter was simplified a little; the growers and packers there agreeing to mark "Extra Fancy," "Fancy." "Choice," and "Orchard

Run." The latter term applying to ungraded apples, and "Choice" to the grade commonly called cooking apples. This should be still further simplified, and only two grades recognized, "Fancy," and "Choice." The term extra applied to fancy does not mean anything. In order to be "Fancy," it must be clean, sound fruit of the highest color for the variety, and there can not well be a higher standard commercially than that. The bulk of our exports must be of fancy grade, but the standard must be raised a little for the choice grade, and a very considerable market can be found for fruit of that grade. It must of course be absolutely free from insect pests, and sound in condition, but may be off color and contain fruit marred by limb rubbing or marked by weather conditions. It can not be too often nor too forcibly repeated that the standard of our fruit must be raised to a higher plane and maintained there if we are to continue to hold our trade.

Great progress is being made each year in the matter of shipping of our more perishable fruits to distant markets.

When we are well supplied with pre-cooling stations and refrigerating plants we can successfully enlarge the market for all our more perishable fruits, such as strawberries, cherries, plums and prunes. These already reach a very wide market, but the scope can be doubled at least, with proper facilities.

Oregon is in a position now to become the leading apple and pear producing state in the Union. We have the reputation for the highest quality grown anywhere and we have more suitable land than any other state. The completion of the Panama Canal will put us in splendid shape for reaching the markets of Europe by means of refrigerator steamers with freight rates one-half less than we are now paying. The natural advantages are all ours and it only remains for us to do our part and in ten years the fruit production of the State should reach the sum of $50,000,000.

PEAR CULTURE IN OREGON

By CHAS. A. PARK, *Commissioner for Second District.*

Actual demonstration has proved that pears will grow in Oregon. Now, Oregon is a large state and it would hardly be safe to say that pears will grow in all parts of the State equally well, so my remarks will be limited to apply to those parts of Oregon, where it has been demonstrated that pears will grow to perfection under normal conditions. If you should enter the State from the south on the line of the Southern Pacific Railroad, you will find large pear orchards in the first valley you enter, which is the Rogue River Valley; as you go further north, you enter the valley of the Umpqua River, and again you find large pear orchards; proceeding further on your way to the north, you will find yourself in the midst of the Willamette Valley and here your eye beholds other large pear orchards. You will notice that all of these valleys lie in the western part of the State, which is immediately east of the Coast Range. There are other regions in the State where pears are grown, but they have not been developed to any extent. Of these three valleys mentioned, the Rogue River Valley stands first where pears are grown most extensively. There you find more pear orchards and larger pear orchards than in any other part of the State, and in that valley there are more people who are engaged in pear culture as a primary business, than in any other part of the State.

All varieties of pears do equally well. The Bartlett stands first as to quantity and following this variety are numerous varieties of the so-called Fall pears. An orchard composed of Bartletts and Fall pears is the most satisfactory for the reason that the harvest of the crop is prolonged. The harvest of the Bartlett commences about the first of August and continues on into the harvest of the Fall Butter, Buerre Clairgeau, Anjou, Onondaga, Bosc, Duchess, P. Barry, Comice and Winter Nellis, which closes near the end of September.

In planting a pear orchard care should be taken at every step and there are many details to be worked out. First of all is the proper soil condition, a pear tree should have a soil not less than six feet in depth and well drained. It will do equally well in the gray clay loam of the bench land and in the more sandy alluvial soil of the bottom land. We have both of these conditions in the Wallace Orchard and there is no difference as to results, both in growing the trees and producing the fruit. The orchard should be planted on the rectangular plan and the trees should be from twenty-one to twenty-five feet apart. Yearling nursery stock is preferable for planting. Solid blocks of any one variety should be avoided for the reason that many varieties of pears are not good self-pollenizers. I mean by this, that in order to produce fruit the seed of the fruit must be fertilized by the pollen. In many varieties of fruit the pollen of the blossom does not ripen at the proper time to fertilize the stamen of its own flower, but the pollen of other varieties of the same fruit may come in contact with and fertilize these blossoms. The problem of pollenation is too extensive to be even attempted in this article even if I had the ability to set it forth correctly. Suffice to say that in order to get the advantage of the cross pollenation of the pears, plant three or four rows of one variety and then a row or two of some other good variety of pears, both of which are known to pollenate each other.

After the trees are planted good cultivation should be practiced. Do not attempt to grow any crop between the rows, but attend primarily

Claigeau Pear Trees, Rogue River Valley.

and solely to the growing of the trees. The young trees should be headed low, not over eighteen inches above the ground and I would prune the young tree so as to produce the vase shaped tree. Keep the limbs headed back, so as to produce a stocky and strong limb. When the trees are old enough to bear crops of fruit, it is well to raise a cover crop in the orchard frequently and plow it under so as to keep up the fertility of the soil. Do not allow the trees to grow high into the air, keep them headed back so that you can spray them easily, which is absolutely necessary, and so that the fruit may be more easily gathered, both of which items are a saving in expense. We have trees that are headed back every year so that they do not grow any larger, but they grow stronger and are able to support a full crop without a prop to keep the limbs from breaking. If left alone pear trees will grow very large. I have seen pear trees that were at least fifty feet high and had a spread of forty feet. It is impossible to give such a tree the proper care and very difficult to save even a minor portion of its load of fruit. In passing I will state that I have seen many of these large pear trees throughout the Willamette Valley, they were planted by the pioneers of this valley. I remember of seeing one of these trees cut down for fuel. It measured twenty-four inches in diameter at the base and I counted forty-five rings in the cross-section of the cut; each ring represented a year's growth, and the trunk was sound throughout. As to how much longer such a tree would live and produce a crop of pears, if left alone to the forces of nature, I leave for you to conjecture.

Do not think that all a young orchard needs is cultivation, that because the trees are small they need no other care. The trees must be pruned every year, they must be sprayed every season. Some sprays are used as a preventive and some sprays are applied as a specific remedy. There are fungous diseases and insect pests that will sap the vitality and life of the tree if not controlled by known remedies. The better plan is to keep the orchard free from all these ills, rather than to rescue it after infection has taken place.

The trees should begin to bear crops of fruit when they are 8 or 10 years old. Now that the trees are in bearing, the fruit must be sold in some market, for the hand that holds the plow, the pruning shear and the spraying rod must be compensated.

What a beautiful sight it is to stand near by where you can overlook the Comice trees, the Buerre Clairgeau trees and P. Barry trees, all uniform in size and well-laden with fruit evenly distributed. As the afternoon sun strikes the ripening pears a flame is thrown over the orchard and you realize the promises of the orchard have been fulfilled, the prophecy of the spring has been rolled into history. The forces of nature have been guided to produce a perfect product. The remainder of the work is mechanical.

How will the fruit be prepared for market and where is the market?

The pears are picked by hand and handled as carefully as eggs, carried from the orchard to the packing house near by on spring trucks, each pear is wrapped in paper and properly placed in the shipping box. After the cover is nailed tightly on a well-filled box of pears, it is ready for shipment, under refrigeration, to any market in the United States or England. The pears are not only ready for shipment, but are shipped to all of these markets. I have personally shipped pears from the Wallace Orchard to nearly all of the larger cities of the United States and to London, England, with the result that the pears arrived in good condition and good prices realized. Nearly all of the growers of pears are doing the same thing. Markets have become established. What has been done in the past can be more easily accomplished in the future as the grower goes forth equipped with the experience of his predecessors.

Bartlett Pear Trees, Hillcrest Orchard, Medford.

ORCHARD DRAINAGE A NECESSITY

By A. H. CARSON, *Commissioner for Third District.*

There are many orchards, already planted, and being planted where the question of drainage has not had the thought and consideration of the planter that it should have to warrant the future success of the orchard. A fruit tree of any kind cannot be planted in wet, cold soil, thrive, and be a source of profit. If the land is not naturally drained by a gravel sub-soil that is porous, and freely admits of the water from winter rains passing through it, and draining off below, then it should be drained by tiling. Many of our tree planters take it for granted that our hill slopes are naturally drained because of the grade to the slope, when, as a matter of fact, but few hill slopes in southern Oregon but would be materially benefited and improved by underdrainage with tile.

Our hill slopes in southern Oregon are clay loams resting often on a stiff clay sub-soil, or a hardpan from two to three feet below the surface soil. These red clay loams during our winter rains, if resting on a clay sub-soil or a hardpan, hold water in suspension, fill up, and the water then flows off over the surface. A wet winter keeps soils of this character filled with water from three to four months during the wet period. A fruit tree planted in such soil has its roots submerged during all the wet period of the year until in many cases the tree is drowned, actually killed. If not killed, its vitality is so greatly weakened by the roots being submerged for so long a period that when the growing period arrives it fails to respond, and eventually dies.

The hill slopes of southern Oregon from surface indications look the same, red loam. Their adaptability to the growth of fruit of any kind is a question of depth, and the texture of the sub-soil to facilitate drainage. If the red clay loam soil has a depth of four or more feet resting on a porous gravel, or on decomposed bed rock, then such conditions would insure natural drainage, and such soil could be safely planted to the apple and pear, and would by thorough cultivation to conserve moisture give the planter returns for care bestowed. On the other hand, should this red clay loam be from two to three feet in depth, resting on a clay sub-soil, such soil should never be planted to fruit of any kind until under-drained.

This is a shallow soil, with the water-table too near the surface, which would hold water during the wet period which would drown the tree planted in it. The only way to make these shallow soils available for successful tree growth is by under-drainage by tiling. In such soils the water-table being only two feet below the surface, a fruit tree planted in soil of this shallow depth would not have depth of soil sufficient to anchor itself and sustain the force of a strong wind-storm when the ground is saturated with water, as the roots will not penetrate below the water-table. Then there is not a depth of soil that would give soil enough for the tree (should it live) to draw nourishment enough to mature a crop of fruit, and it would not be practical with the best of cultivation to make a tree in such a shallow soil grow, for the reason the soil, being filled with water during the wet period, would not drain off until late in the spring, when the top would bake, and then if stirred with the plow heavy clods would form, and it would be impossible to fine and create a dust mulch so necessary to conserve moisture for the growth of the tree during the dry

Howell Pear Trees, Hillcrest Orchard.

period of the season. Without this dust mulch such shallow soils dry out through capillary attraction to the water-table, then the tree perishes for the want of moisture.

These shallow soils where the water-table is near the surface are during our wet period the wettest soils we have on this coast, and during our dry periods are the dryest. A soil of this kind can be made available for fruit growing by lowering the water-table to four or five feet below the surface by under-draining by tiling. By tiling to a depth of four to five feet the rains during the winter pass through these soils, and drain off through the tile. This draining off through the soil causes in a year or two the clay sub-soil to break up, slake, and become porous, and to the depth you have laid the tile, you have deepened the soil. It takes from two to three years after the tiles are laid for all the stiff clay sub-soil to break up, and become porous. We under-drain shallow soils, and achieve by so doing a depth of soil greater than before drained. We carry off the excess of water that falls during a wet winter through the soil to the drains below. We create a depth of soil that has double the amount of storage of water by absorption that we can conserve for the growing tree by good cultivation, and a fine dust mulch. By drainage we carry the water through the soil which is a fertilizer, making it possible for whatever plant food there is in the soil to decay, and become soluble for the growing tree, and through the action of the air passing through the soil give the tree the essential gases—oxygen and nitrogen—it must have for a healthy growth.

As paradoxical as it may seem, we tile wet land to make it dry, and to make it wet. This is seemingly contradictory, yet it is a fact. Yet no more a fact than that our wettest soils during a wet period are our dryest soils during a dry period. Through tiling we make it possible for air circulation through the tile, and through the soil. At the dryest period the air always is charged at night with more or less invisible moisture, and by the air circulating through the tile and soil particles, condensation through the difference in temperature occurs, and the moisture is left in the soil for the growing plant. This has been one of our very dry years, and where irrigation could not be had, many growing crops have been short, and particularly is this shortage noted on shallow soils. Yet on all soils that have been under-drained by tiling it has been observed that crops, both fruit and truck, have grown luxuriantly. The under-drained soils have had a continual supply of moisture from condensation that occurs from air circulation through the soil by the way of the tile.

Many of our hill slopes that do not require drainage to carry off the water from heavy rains can be made very productive by tiling so as to create the necessary moisture for growing crops through air circulation through the soil.

Where drainage is contemplated, the one who does it must not forget that the deeper the tile is laid, the greater area of ground it will drain, and the deeper he has made his soil. Another essential is grade. Every tile should be laid on grade. In fact, where a plot of ground is to be drained it will pay to have the services of a competent civil engineer to lay off the mains and laterals, and establish the proper grade. There should be no guess-work as to grade. Every tile must be laid on grade, or else the purpose of cutting ditches for tile, which is expensive, would be lost. A single tile out of grade would soon fill up, and your purpose to drain your land would be defeated.

The expense of under-drainage is a factor that perhaps deters many from undertaking it. However, when the benefit derived from under-drainage is once understood the time will come when many thousand acres in Oregon will be under-drained. In fact, the question of irrigation

will be one of the factors that will force under-drainage, as it is one of the problems of irrigation to get the water to the land, and then to get it away from it, and shallow soils with a clay subsoil cannot be successfully irrigated without under-drainage. To emphasize the fact that with general irrigation that will in time come in southern Oregon when the benefits are better understood, that under-drainage will be forced on many of our soils where the water-table is forced near the surface by reason of an impervious clay, or cement hardpan subsoil, I quote Mr. Carl S. Schofield, Agriculturist in Charge of Western Agricultural Extension, Bureau of Plant Industry, which will be found under the caption, "The Problems of an Irrigation Farmer." Year Book of the Department of Agriculture, 1909: "One of the most striking features in the history of irrigation in the Old World is the ruin of irrigation enterprises caused by the rise of underground waters and of alkali. Both in theory and practice these phenomena are closely associated. Arid lands almost universally contain large quantities of soluble salts, because these salts—the products of rock disintegration and soil formation—are not leached out by rain. The more common salts thus formed are sodium chloride, sodium sulphate, and sodium carbonate, and though only the last is really an alkaline salt, the popular term 'alkali" is applied to whatever salts occur in the soil water in sufficient quantities to check or prevent plant growth.

"Excessive irrigation in time fills the soil with water, in which these salts are dissolved, and the evaporation of the water from the ground brings the salts up and leaves them at or near the surface in constantly increasing quantities. Unless natural drainage courses are present or artificial ones are created the inevitable result of excessive irrgation is that the land becomes too wet or too alkaline for the growth of crop plants. This problem of underground waters should be contantly in mind, not only in the selection of an irrigated farm, but also in its management. It does not suffice that a farmer himself uses irrigation water judiciously, for the reckless use of water on adjacent higher land may ruin a farm completely. It is true that either underground waters or alkali alone may cause trouble in some cases, but they occur most frequently together and both yield to the same remedy, which is adequate drainage."

Irrigated land, where the subsoil is not porous and there is reckless use of water, soon becomes swamp. This condition of land becoming swamp is to be found in every irrigation district. From Secretary Wilson's report in the Year Book for 1909, it is estimated that about 700,000 acres of land have become swamps through irrigation, throughout the West. This land is under water, and the only possibility of reclaiming and making it productive is by under-draining by using tile. Any and all contemplated systems of irrigation should have careful surveys made of the subsoil to determine if the same is porous, and will afford the necessary drainage before water is conducted to the land for irrigation, or else the promoters may stand to lose large sums of money.

The outlay at the beginning to put unfavorable land that requires drainage in condition for irrigation is expensive, but the results in production will in the end be a profitable investment. When land is once properly drained, with necessary depth, it lasts forever, and is always productive with ample water, and gains riches with each generation for all time.

THE LABOR PROBLEM OF HARVESTING A LARGE APPLE AND PEAR CROP

By A. H. CARSON, *Commissioner for Third District.*

It is poor business method on the part of the apple and pear growers to grow large crops of apples and pears in the Rogue and Umpqua valleys without seriously considering the labor problem.

To harvest the crop in its proper season, quickly, with the least cost to the growers, is one of the problems that must be considered, and the best methods as to the details worked out to pick and pack the crop at a minimum cost to avoid loss. At present the acreage in apples and pears in the third district that are in bearing is only about twenty per cent of the acreage that is planted. To harvest the present crop taxes the available labor that is to be had in the district. There are at present in Jackson, Josephine and Douglas counties 1,650,000 apple and pear trees in the old and newly planted orchards. Annually the new orchards are increasing the number of trees by 600,000 to 800,000. Had the present acreage been in bearing this year, and averaged five boxes to the tree, there would have been 8,250,000 boxes of apples and pears, or 13,583 carloads. With the present population of the third district, if we had to pick, pack and ship 13,583 cars of apples and pears, where could the labor be drawn from to save the crop without loss at a minimum cost?

In gathering pears the time to handle the different commercial varieties is limited. The reasons vary. Some years pears ripen slowly. To meet the various conditions of ripening and gather the crop with economy requires the necessary number of laborers in the country for the growers to draw their help from at harvest time.

The same conditions as to labor prevail at apple-picking time. When Newtowns, Spitzs, and other commercial varieties are ready to pick, they should be gathered promptly and stored in the packing house. The grower takes a risk to let his apples remain on the trees after they are ready to gather. Should the grower let his apples hang when ready to gather, he is liable to loss from the fall rains that always bring with them more or less wind that shakes off many choice apples. The loss from wind is always to be considered, and only ample labor to gather and store quickly can reduce this loss to a minimum.

In Jackson County there are several orchards that contain four hundred acres, or more, under one management. When these large orchards come into bearing, and produce maximum crops, the picking, packing and shipping to market will call for the best business methods to handle with economy and without loss.

If labor is ever so plenty, the handling of a large force of apple pickers in one of these large orchards requires thorough organization to work at the best advantage to secure the best and most work at the least cost. The average apple and pear picker has only his daily or hourly wage in view, and unless supervised by a competent foreman much fruit may be injured in gathering by careless handling in picking that might make it unfit for long-distance shipping, causing a loss to the grower.

The question of labor is in my opinion of such vital importance that I would suggest the fruit-growers all over the state, in their horticultural

Comice Pear Trees Near Medford.

meetings, raise the question as to the best methods of quickly and cheaply picking an apple and pear crop.

Through the horticultural societies this question can be discussed, and details worked out by the best business talent in the societies on business lines that will appeal to the majority of the growers, so that each may take advantage of the best system in the conduct of harvesting a large apple and pear crop.

To secure apple pickers, I quote the methods of a large apple grower in West Virginia: "When he could estimate the number of pickers he would require, he advertised in the local papers that pickers were wanted, also sent hangers to all the local stores in his county that pickers were wanted, and requested those who desired to pick to make application. Three times the number required made application. In order to hold the best of these applicants, certain rules and regulations were adopted covering the conduct of the pickers. Some of the more hilarious spirits objected to the rules, and at once were discharged, and others taken in their places.

"This enforcement of discipline at the beginning had an excellent effect. The pickers retained were divided into squads under competent foremen. The pickers were responsible to the foreman, and each foreman was responsible for the work of his squad to the manager. Each foreman was furnished with written instructions in regard to the picking, which they were to follow. The pickers were paid for their work by the hour."

That rules and regulations as to how apples should be picked, and a strict enforcement of the same, are necessary, where a large number of pickers are employed, is evident. It is useless to grow and mature a large crop of apples and at gathering time have them carelessly picked and bruised to lessen their value in shipping a long distance to market. Nearly all apples and pears grown in the Northwest Pacific states have to seek a market in the East, or in Europe, hence the greatest care in gathering and packing to get to the long distant markets in the best of condition must always be considered.

TEACHING HORTICULTURE IN PUBLIC SCHOOLS.

By R. H. WEBER, *Commissioner for Fourth District.*

With the great "Back to the Farm" movement now in progress, and which is particularly strong in the Pacific Northwest, the question as to how are the city folk who answer nature's call and migrate back to soil and nature prepared to cope with the difficulties confronting them in their newly chosen vocation naturally arises. This question is difficult of solution, and would suggest the necessity of reconstructing our methods and system of public school education to include courses in agricultural and horticultural training in all elementary branches. Particularly is this true of horticultural subjects, for if we are to grow "BETTER FRUIT" we must of necessity have "BETTER FRUIT GROWERS," and to get these requires training. True it is that our agricultural colleges offer some relief in this direction, but the students attending these institutions are of an advanced age, and, lacking the elementary horticultural training which should be supplied in our public schools, find themselves obliged in early manhood to resort to a primer in the two most important industries, Agriculture and Horticulture. We, in Oregon, especially in those districts where fruit growing is the principal industry, should insist on having included in the curriculum of our public schools the elementary principles of this most important branch.

Farm life of today, especially the remunerative horticultural branch, offers splendid pecuniary rewards when carried on scientifically, and is a most pleasant and attractive vocation.

While there are on record cases of city-bred men having successfully met and conquered the soil, it cannot be vouchsafed that they entered upon their work without much trepidation such as would entirely be eliminated with proper early training in soil tillage. Why, with all professional branches crowded to the starvation point, we should persist in preparing a still greater army for the professions, to which our present educational system leads, when the farm offers a ready solution of the problem, is difficult of comprehension.

With modern conveniences, such as gasoline engines, for instance, to pump water and do innumerable other chores and supply power for electric lighting, the farm offers irresistible attractions today that were unknown to our fathers.

Let us then break away from the old slip-shod way of farming without any knowledge of the art by inculcating in the minds of the young in our public schools the required knowledge that will enable them to enter upon farm work with a comprehension that will make it as fascinating as it is bound to be profitable.

The problem of "HIGH COST OF LIVING" would readily be solved by training the youthful minds of the urbanites along agricultural and horticultural lines, thus creating in them a desire to remove into God's free country, with its many blessings, away from the contaminating influences of overcrowded tenement and other cheap lodging districts in our large cities, where they would soon not only be self-sustaining by reason of producing everything needed for their own wants, but assist in supplying those who perforce were compelled by circumstances or choice to remain in their urban caves.

Farming, no more than any other business, can be done by one who does not know how, although it is a good business, when properly conducted by one who knows the business, for as it is, the man without training or experience would be apt to prove a dismal failure at farming as he would as a merchant or manufacturer, were he to enter this field without training.

Let us then make every endeavor to bring about a knowledge of farming among the masses, as a solution of social and economic conditions confronting the present and future generations.

THE STONE FRUITS IN OREGON

By R. H. WEBER, *Commissioner for Fourth District.*

The stone fruits have for many years occupied a prominent position in the horticultural industry of the State; in fact, it can be said that the position of stone fruits is in the lead when considered from a financial point of view as reference to the files of the biennial reports of the State Board of Horticulture will readily show. Nor is there much danger that this position will be surrendered to any other class of fruit in the very near future, as many trees are being planted every year of all kinds of stone fruits which flourish in all sections of the State of Oregon and greatly add to its fame as one of the greatest fruit-growing states in the Union, and which in a few years hence will doubtless rank first in point of acreage and quantity of fruit produced.

The Italian prune at this time is unquestionably in the lead as to number of trees in bearing and quantity of fruit produced. This variety in the evaporated state now finds ready sale in the markets of the United States and Europe, with an ever-increasing demand on account of its large size and fine quality. Nowhere in the wide world does the Italian prune grow to greater perfection, both as to size and flavor, than in this State, many thousands of acres of rich soil both in eastern and western Oregon are devoted to its growth.

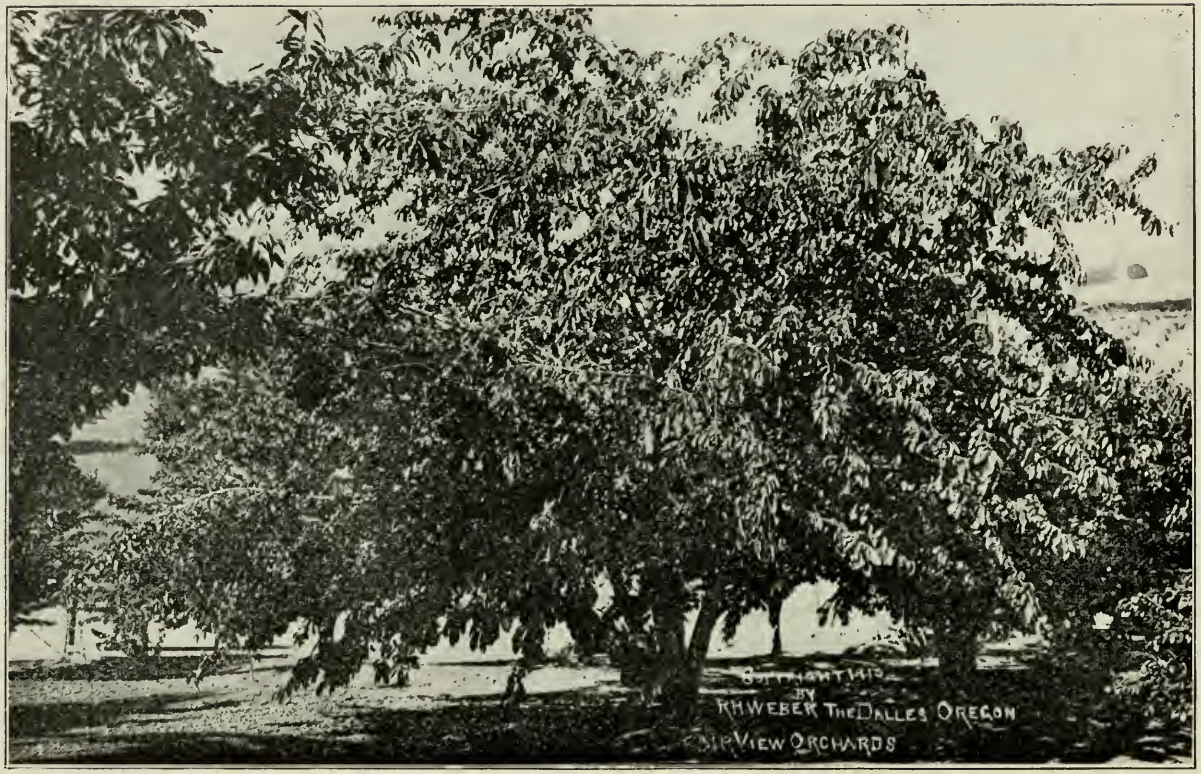
Perhaps in no other place in the known world are there so many large Italian prune orchards as in the Willamette Valley, yielding annually many millions of pounds of the dried product and bringing to the State sums of money which run above a million dollars every year. While the product of the prune orchards in western Oregon is put upon the market in the evaporated state for the most part, those grown on the eastern slope of the Cascade mountains are invariably shipped in the fresh state to the eastern and even European markets, to which places they are shipped under refrigeration and where they find a ready market at profitable prices to the growers. Demand for prunes, both dried and fresh, has been so strong the last few years and prices have ruled so high that many growers are making extensive additions to their orchards.

The prune, being a staple product, and being marketable both fresh as well as evaporated, there is little danger of an over-production, especially since its production is practically confined to the Pacific Northwest, and principally to the State of Oregon, which is in the proud position of being looked to by the entire world for its supply of Italian prunes.

Plums do well in all parts of Oregon, but as they cannot be profitably evaporated and must be marketed fresh, there is not so large a field for them as for prunes, unless our friends, the canners, should come to the rescue and put them into cans to be put upon the market. There is, however, a great demand for the large, juicy plums which grow in Oregon in our eastern cities, and many carloads find their way to these markets every year. If varieties and locations were studied, there is no question but what much money could be made raising plums, for they surely grow to perfection as regards size and quality and are wonderfully productive. Many of the newer varieties recently introduced are immense in size and beautiful in color with most delicious flavor and bring enormous prices.

PEACHES.

Next to prunes in order of acreage come peaches, of which Oregon has many large orchards and thousands of trees yielding immense revenue to their lucky owners. If there is a place in the State where peaches will



Cherry Tree referred to by Mr. Weber.

not grow, it had not been discovered up to the time of the taking of the last census. The annual production of peaches within the boundaries of the state amount to millions of boxes, which find a ready market in the cities of our own and adjoining states and in Alaska for the most part, while a great many carloads find their way to a profitable eastern market. While peaches are the most perishable fruit grown in the State, the fact that their period of ripening extends over so long a season makes them a most desirable fruit. Season of ripening begins in the month of May for the earliest sorts, and extends away into October, a period of six months. This is really the poor man's fruit to raise, as it enables him to harvest his own crop with his own help, thus saving the wages of hired hands whose pay soon eats into the profits.

Nectarines grow to perfection in Oregon, but the fruit-eating public does not take kindly to them, so it does not pay to raise in commercial quantities, and we will dismiss them without further comment.

APRICOTS.

Demand for apricots of late years has been so great that growers have been unable to supply their customers with either the fresh, evaporated or canned stock. This brisk demand has had the tendency on growers to extend their plantings considerablv and unless the markets continue to improve on this varietv, a few years will see the product nearer equal the demand. Apricots flourish as if indigenous to Oregon's soil, and as they come into bearing very young. and are heavy annual yielders, they are a most profitable fruit to cultivate. Their season of ripening does not extend over so long a season as peaches, and for that reason they are somewhat more difficult to handle in large quantity.

CHERRIES.

Last, but not least ,come cherries. If peaches can be called the poor man's fruit, cherries certainly have the distinction of being the lazy man's fruit. The cherry, after it comes into bearing, requires the least work and attention of any fruit grown, and therefore the profits derived from its production are correspondingly greater. Pruning of cherries is unnecessary after they come into bearing; spraying is next to unnecessary, as the common orchard pests seldom attack it, and owing to the fact that it ripens its fruit in four months from the bloom it requires but a short season's cultivation, as cherries should not be cultivated after the fruit has been picked. The only thing of any importance that needs doing is picking the fruit, and after that counting the money, then eight months for travel and recreation until the next season's crop requires attention. On account of the small cost of production, cherries are the most profitable of any fruit crop grown in Oregon. Care must be taken in selecting a location for cherries, as they require a well drained soil and will not stand for wet feet.

The fact that cherries are in great demand fresh, canned, evaporated and preserved or maraschinoed, is full proof against an over-production, and will always insure a good market at fair prices. Another matter to consider in connection with cherrv culture is the fact that they cannot be profitably grown except on the Pacific Coast, and only in favored localities here, so that it would seem certain that the cherrv business will always be profitable from the growers' standpoint. Cherries are most prolific. The tree in the accompanying cut bore 620 pounds of fruit this year, which at the low price of 5c per pound would be $31.00, a large sum when it is considered that the cost of production is much less than that of any other fruit, leaving the net profits correspondingly greater. For the

reason that they mature their fruit so early in the season, before the winter's moisture is exhausted, cherry trees can be planted closer than other varieties of fruit, greatly increasing the per-acre yield over other kinds of fruit.

The stone fruits as a general thing are produced much more cheaply than apples or pears, as most of them ripen early in the season, require less cultivation, this we will call saving No. 1; with the exception of peaches, apricots and a few varieties of plums, thinning of stone fruit is not required, which is saving No. 2; positively no summer spraying necessary, as codlin moth, so destructive to apples, attacks not the stone fruits, this is saving No. 3. Supposing now that each point of saving amounts to 10 per cent in cost of production, we then can grow our stone fruits 30 per cent cheaper than apples or pears, which naturally must bring correspondingly larger profits.

SMALL FRUITS IN EASTERN OREGON

By JUDD GEER, *Commissioner for Fifth District.*

There are few section in eastern Oregon where the farmer cannot grow almost the entire list of small fruits that can be grown in a temperate climate; cherries of every known variety as well as berries of every kind; the red, yellow, and black raspberries, strawberries, blackberries, loganberries, gooseberries and currants, as well as a large number of novelties which are of no commercial value.

The question is not what we can grow, but what shall we grow, that will be of commercial value? So easily are these fruits produced that I feel that it is hardly necessary to treat the subject for the benefit of the family table, as whatever applies to the commercial phase of the question applies likewise to the producer for home use.

The object of the Horticultural Board is to aid in developing an industry, hence too much thought and consideration cannot be given to the money-making side of the question, as it has been proven in many places that it is only where fruit has been grown of highest quality and the best methods have prevailed that the most money is made. I feel that one of the leading points in view in building up an industry is the money side of it. It appeals to the practical man when all the theories of scientific research fail to move him.

The Cherry.—Cherries most easily take the lead over all small fruits. The grower who is seeking something which will yield him good money early in the season can make no wiser move than to plant a cherry orchard. The climate and conditions seem made for this fruit in Eastern Oregon. The early rains mature the crop without irrigation; yet, I have never known a crop to be injured to any extent from cracking because of rain. The dry season usually begins at about the time of the harvesting of this crop. The cool nights of our high altitude produce a fruit which is very solid and firm and will bear shipping long distances, some specimens of which I have known to be two weeks in transit and the fruit remain sound.

No crop save strawberries brings returns so early in the season. While we cannot hope to get the big prices realized by the California grower, still we have a "good thing" and that should satisfy any reasonable grower.

For my own use in growing for profit, the list has practically narrowed down to three varieties, the Bing, Lambert and Royal Ann; although there is a large list of very choice cherries which are equal and perhaps superior for family use, there has proved to be little or no money in growing them. We are too far from market to consider the sour cherry as a source of income. The Bing cherry is a wonder; it seems not to have a fault. It is ahead of any known variety for this climate. The Black cherry, however, will not bring so good a price by 25 per cent when sold for canning or preserving and when the fresh fruit market "goes to pieces" as it sometimes does the fruit must then be sold in bulk for such purposes. For this reason I would plant largely of Royal Anns. During the past cherry season an eastern firm bought the bulk of the Royal Anns in Grande Ronde and shipped them in large barrels containing some liquid preservative. They were to be made into the famous Maraschino cherry of commerce, so much used for flavoring and decorative purposes where choice ices and drinks are served.

Fifteen-year-old Walnut Tree, Cresswell.

The demand for cherry trees far exceeds the supply. For some reason they have proved with me more difficult to propagate than any other tree. Something seems to happen every year to cut off the supply of cherry trees. I would give a good deal to know a safe and sure method of growing the infant tree. Under present conditions the price of it must remain high. In growing the cherry as well as other fruits, "eternal vigilance is the price of success." The trees must be closely watched lest diseases invade your orchard and destroy either the trees or fruit.

The following is well worth preserving by those who are interested in cherry growing. The bulletin was prepared by Prof. S. A. Beach and E. E. Little of the Iowa Agricultural College, after actual test approved and recommended by some of the most successful practical growers. From experience I can say last year curculio nearly destroyed my cherry crop and had been more or less troublesome in previous years. I followed directions with best possible results, the cherries being free from worms.

GENERAL TREATMENT FOR THE CHERRY.

When to spray and what to spray for: (1) Just before blossoms open, for fruit rot, Bordeaux mixture; (2) just before blossoms fall, fruit rot, leaf spot, Bordeaux mixture; curculio worms in fruit, paris green or arsenate lead; (3) just after picking fruit, leaf spot, Bordeaux mixture; (4) three or four weeks later, repeat 3 for leaf spot; (5) for cherry slugs, when first seen any time during season except when fruit is ready for market, paris green or arsenate of lead.

THE STRAWBERRY.

Next on the list of small fruits I place the strawberry. It is first in importance among berries. It is not only first in quality and first in season, but first in money value. I think I can safely say that its cash value to the people of Oregon is easily ten times that of any other berry. It has not one failing. It is queen among berries, and there is point in the old rhyme—

"When the angel made shad the devil was mad;
For it seemed such a dream of delight,
So he worked hands and feet, to spoil the good meat,
And he stuck in the bones out of spite.
When the strawberry red first illumined their bed,
The angel looked down and was glad.
But the devil, 'tis said, fairly pounded his head—
He had used all the bones on the shad."

By all means select a berry of dark rich color clear through and of firm texture. Probably there is no better berry when it can be grown than the Clark's Seedling that has won a name for itself in the markets over half a continent. In some places it does not succeed and it is best to use those varieties that are well known to be adapted to your particular location, while testing for better varieties.

Of course much depends on the handling of the fruit when grown; much care being given now by successful growers to putting the fruit up in an attractive way, sorting out the small berries and facing the basket with those of an even size. In many cases they are literally packed like other fruit. There is less jarring in transit and the fruit is in much better condition if packed firmly. When strawberries are grown for a permanent business great care should be taken that the soil be thoroughly prepared before setting the plants. It should be plowed, harrowed, and thoroughly pulverized. In the matted row system mark the rows three feet apart and cross-mark the rows 30 inches apart so that you can cultivate both ways until the runners get a good start. Do not cut off the first runners except in hill culture. Let

the first ones set and train them to fill the positions in which you wish them to bear fruit. When you have the rows filled remove all surplus runners. For hill culture in the field mark the rows 30 inches apart and set the plants 12 or 15 inches apart in the row, keeping off all runners so that the plants may stool. It may be necessary to combat some of the pests which annoy the strawberry grower, so I append the best method obtainable.

GENERAL TREATMENT FOR STRAWBERRY.

When to spray and what to spray for: (1) When growth begins and as often as necessary for rust or leaf spot, Bordeaux mixture; (2) after picking fruit, cut and burn foliage on windy day; (3) at first appearance of leaf roller, arsenical poison every week if necessary but not after fruit is half formed.

THE RASPBERRY.

Next in line for quality, popularity, and quantity produced is the raspberry. Following closely after the strawberry it fills a much-felt want in the markets. If anything would make us cease to miss the strawberry it is the advent of the raspberry season. There are several varieties quite different in flavor and manner of growth. The same method of treatment applies with but slight variation to all varieties.

Of course the soil must be thoroughly prepared as for strawberries; if any difference the plowing should be unusually deep as the plants once placed remain for several years and the roots should have every opportunity to grow deep that the plants may obtain every possible amount of moisture. This berry, as well as all other varieties, requires a large amount of moisture in order to produce luscious fruit.

Red raspberries are usually propagated by transplanting the numerous suckers which come up freely around the original hills. The black raspberry, usually termed the black cap, does not sucker so freely and the best plants are obtained by cuttings laid down in the fall.

For a commercial plantation the plants are best placed four by eight feet apart as this gives room to cultivate, disc, or spray without injury to the plants. This is important to the commercial grower, as one man and team can do more and better work in a day than half a dozen men with hand tools. The ground should at all times be kept clean and well cultivated.

The canes growing one summer bear fruit the next season and then die, while new canes develop each year for the succeeding crop. Frequently the canes which have fruited are allowed to remain until the following spring before removal but better results are obtained by cutting and burning them as soon as the crop is harvested, besides insects and fungous diseases are often destroyed by so doing. In the spring the growth of new canes should be thinned. From three to five canes to the hill are better than a larger number.

GOOSEBERRIES AND CURRANTS.

These berries are easily grown and so far have not proved profitable in a commercial way in this section. I have known some growers to experiment for a few years with them but they soon cleaned out the plants and used the space for something more easily turned into money.

If you have the variety that you want and take the trouble to encourage natural layering it is best to grow your own bushes. If you are depending on a nurseryman by all means order very early. They start at a very low temperature and even en route if the weather is warm they will start to grow, which of course injures them. Any limb with a root, however tiny, will make a bush if carefully transplanted early in the season.

SMALL FRUITS IN WESTERN OREGON

By H. M. WILLIAMSON, *Secretary of the State Board of Horticulture.*

In this article Western Oregon will be considered as including that part of the State which lies west of the Cascade Mountains, excepting that portion thereof drained by the Rogue River.

The natural conditions of Western Oregon are peculiarly favorable for the production of small fruits. The temperature rarely falls to zero in winter, and the summers are cool and free from drying winds; and large yields, produced through a prolonged ripening season, are the rule.

THE STRAWBERRY.

In Western Oregon, as elsewhere, the strawberry is the leader among small fruits. Few other sections can be found where the strawberry yields such large crops of fruit of the best quality as are grown here. By reason of the ample supply of choice berries at a moderate price throughout a long season the consumption of strawberries per person is unusually large in Portland and the other cities of the State. The quantities taken by canneries is steadily increasing, and this increase will be more rapid when the completion of the Panama canal gives freight rates sufficiently low to encourage the shipping of canned strawberries to eastern markets. By reason of favorable climatic conditions strawberries are grown at lower cost in Western Oregon than in any portion of the United States east of the Rocky Mountains. The United States census of 1900 showed that Oregon then raised more strawberries than Iowa and 50 per cent more than Minnesota, although Iowa then had more than five times as many inhabitants as Oregon, and Minnesota about four times as many.

The pioneer settlers of Oregon found strawberries growing wild here in great profusion and for many years the wild strawberries sufficed to meet the wants of the farmers and of the residents of the smaller cities and villages of the country. The native strawberries of Oregon begin to ripen earlier than any cultivated variety, but little effort has been made to select or propagate from this stock varieties worthy of cultivation.

In 1858 Seth Lewelling brought from the east a number of varieties of cultivated strawberries but found the demand at that time for strawberries so small that it did not pay to raise them. A few years later the demand for strawberries in Portland began to grow rapidly.

Partly by chance and partly as a result of systematic effort a number of new varieties of strawberries have originated in Oregon in the past 30 years which have proved especially well adapted to production in this State. It is probable that at the present time more than 90 per cent of the strawberries grown in the State are of varieties which originated in Western Oregon. The leaders among the varieties which originated here are the Clark's Seedling (also called the Hood River and Clark's Early), Magoon, Oregon, and Gold Dollar. The oldest of these varieties is the Clark's Seedling. It originated as a result of experimental planting of strawberry seeds by Mr. Fred Clark, a gardener and fruit grower who lived in the Mount Tabor district near Portland. The date of its origin has not been learned but plants of this variety were set at Hood River in 1883 by Mr. T. R. Coon. The variety proved peculiarly well adapted to the Hood River Valley and for many years

Original Magoon Strawberry Plant. Standing in a large washtub.

has been the only variety grown for shipment from that place. As grown at Hood River it is the best shipping strawberry grown in the United States and outsells all other berries in every market in which it has been introduced. It is commonly known in the markets to which it is sent as the Hood River strawberry. The berries are of medium size, richly colored all through and present a most attractive appearance. The berries contain more of both acid and sugar than the average strawberry which gives them a decidedly rich flavor although they are to be classed with sour rather than with sweet strawberries. This variety is not as popular with growers in Western Oregon as with those at Hood River. It yields as a rule less than half as much as the varieties grown for supplying the home markets of Oregon and the Pacific northwest. At the present time no effort is made to ship strawberries to distant points from Western Oregon and the superior shipping and keeping qualities of the Clark's Seedling do not offset its smaller yield in producing berries for the home market in the opinion of the majority of the growers. There has been observable within the past two or three years a tendency to increase the production of this variety in Western Oregon from the facts that an increasing number of consumers are willing to pay a materially higher price for it than for the larger and milder flavored varieties, and that in times of glut the Clark's Seedling can always be sold to the canners who will not buy large and soft berries except in times of great scarcity. The Clark's Seedling thrives best on soils which contain a considerable proportion of sand but it requires more moisture than almost any other variety, being in this respect like the old Triomphe de Gand, which was, before the introduction of the Clark's Seedling, the best shipping berry grown in Oregon.

The leading strawberry grown for the home markets in Western Oregon is the Magoon. This variety originated as a chance seedling in the garden of W. J. Magoon, a fruit grower in the suburbs of Portland. He first called attention to it at a meeting of the Multnomah Fruit Growers' Association held at the South Mount Tabor school house, June 9, 1894. He took one plant from the ground with care and set it in a common washtub and exhibited it at the meeting with its load of fruit in all stages of development. Within four years from that date the Magoon had become the leading strawberry in the Portland market and has held first place up to the present time. The berries are large, symmetrical, a deep crimson in color, and of excellent quality. They hold their appearance well after picking and stand shipment better than most large strawberries. They are among the best of the large berries for canning but are not taken by canners when a sufficient supply of Wilson or Clark's Seedling strawberries can be obtained. The season of the Magoon is rather later than the average, and it is one of the varieties which can be made to bear in the fall; in fact in Western Oregon it frequently bears to some extent in the fall with ordinary care. The worst fault of the variety is that the fruit lies on the ground. It thrives best on deep clap loam soils. The vine growth is very large and the richer the land the further apart the plants must be.

The "Oregon" originated near Salem a few years later than the Magoon. The berries are large and handsome, and very attractive when fresh but do not retain their fine appearance as well as the Magoon. A few growers prefer the variety to the Magoon, but the greater part of the growers report that the Magoon surpasses the Oregon in yield and is a better market berry. The Oregon is highly commended for raising for home use as it can be had fresh from the vines in perfect condition and has a long bearing season.

The Gold Dollar was originated by Mr. Z. Mills, of Springbrook, Oregon, and was one of a large number of seedlings grown by him.

He believes it to have grown from a seed of an Excelsior berry. It is as early as the Excelsior and begins to ripen soon after the first of May in the Willamette Valley. It is larger, handsomer, sweeter, and more prolific than the Excelsior and is fast supplanting that variety in this State. The berries are too soft to permit their shipment except to markets near the place where raised. There are a number of other new varieties of promise which have been originated in this State but which are not yet thoroughly tested.

The only varieties introduced here from the east which are grown to any great extent in Western Oregon are the Marshall and Wilson. The Marshall is as large or larger than the Magoon and somewhat resembles it in shape and appearance. It ripens a little earlier than the Magoon. Apparently it is better adapted than the Magoon to the typical hill lands of the Willamette Valley, but this has not been as yet thoroughly settled. A large majority of the growers prefer the Magoon to the Marshall, and report the Magoon much the better yielder of the two, and say that the Magoon holds up better after being picked than the Marshall.

The old Wilson is still grown to a considerable extent in Western Oregon because it is preferred to all other varieties for canning both in the home and by commercial canners. It requires especially careful culture in order to prevent the berries from becoming too small in the latter part of the bearing season.

The Warfield does well in Oregon and is an excellent all-purpose berry but is not grown enough to be known on the markets of the State. The Excelsior, which for a number of years was the first early strawberry on the local markets of home growth, is now being abandoned by growers as the Gold Dollar is a more profitable first early variety for the home markets.

SOILS, PLANTING, CULTIVATION, ETC.

Strawberries can be grown on almost any of the soils of Western Oregon. The type of soil known as a clay loam is the best for most varieties. Peaty soils should be avoided and soils which are coarse grained and dry out quickly are not satisfactory. Land which has been under cultivation for many years is usually too deficient in humus and if strawberries are to be grown on such soil a crop of common vetches should be grown and plowed under the year before the plants are set, the vetches to be followed by cultivated crop. It is not well to plant strawberries on land which has recently been in clover as the crown borer works in both the clover and strawberry plants. Flat land which lacks drainage is not desirable. For the earliest varieties a southern slope of a hill is desirable if the site is such as to be unusually free from frost.

The preparation of the land should be most thorough. Mr. A. J. Shipley, a successful grower of Monmouth, Oregon, says he has never been able to get his land in first-class condition for planting with less than three plowings, following each plowing with thorough discing. He says further: "The first plowing should be about four inches deep; the second, seven, and the third about ten inches deep. When the ground is in proper condition to work it can't be disced, harrowed, and clod-mashed too much."

Strawberry plants may be set in the fall or as early in the spring as it is possible to get the soil in good condition. Many growers prefer to plant late in the spring as the soil can then be more readily put in the best condition than earlier.

If the plantation is large enough to permit, it is best to set the plants of the varieties which make large tops so they can be cultivated both ways. On good soil Magoon plants should stand three and one-

half feet apart both ways as this variety makes large tops and does not bear well if the plants crowd each other. Marshall, Wilson, Oregon, and Gold Dollar plants may be set three feet apart if cultivated both ways, or three by two if cultivated one way. Clark's Seedling plants may be set eight inches apart in rows three feet apart, or the plants may be set two feet apart in the rows and each plant allowed to set three or four additional plants lengthwise of the rows.

When obtaining plants for setting one should take pains to obtain young plants set from runners of plants that have not fruited, as such plants are more vigorous than those developed from plants which have been exhausted by bearing. The plants should be carefully handled when taken up so as to keep the roots from drying out. As soon as the planter receives them he should at once heel the plants in mellow moist (not wet) soil. When preparing for planting straighten out the roots and cut off about one-third of the length evenly with shears. Cut off also all but two of the leaves. Be sure to keep the roots moist from the time the plants are taken out of the ground until they are set. The land is usually marked with a sled with runners which can be adjusted to the desired width. In planting very large fields machine planters are used. Ordinarily the work of planting is done by two persons. One of these uses a spade which is set in the earth where the plant is to be and is then shoved forward, leaving a space for the plant. The other person who carries the plants takes a plant, spreads its roots and inserts in the space left by the spade in such a way that the crown will be just barely below the surface of the land. The spade is then withdrawn in such a way as to avoid hitting the plant or its roots and inserted back of the plant and pressed forward to fill the cavity in which the plant was set. The earth should then be firmed around the plant with the foot. Planting should never be done when the earth is so moist that it will not crumble when compressed in the hand and then released. This applies to the planting of all plants and trees.

Frequent cultivation throughout the growing season is necessary. After every rain the land should be cultivated and clod-mashed as soon as it is dry enough to work. This should be supplemented by hoeing around the plant to mellow the soil not reached by the cultivator. With such varieties as the Magoon, Marshall, Oregon, and Gold Dollar cut all runners as they appear. An old scythe bent into semi-circular form and provided with a handle makes a good runner cutter.

It is considered the better practice to clip off all blossoms which appear the first year. The cultivation should be as thorough the second year as the first. As soon as the crop is picked the plants should be mowed and when the tops are dry burn them. As soon as this is done cultivation should be resumed and kept up during the season. It was formerly the custom to take four crops of strawberries from the vines in Western Oregon before plowing them up, but since the crown borer and other pests have been introduced it is not now common to take more than two crops, and after the second crop is harvested the land may at once be plowed. If the same land is wanted for strawberries again vetches should be sown early in the fall to be plowed under in the following spring and be followed by a cultivated crop before strawberry plants are again set.

Commercial fertilizers have not yet been used to any extent in raising strawberries in Oregon, but in a few instances applications of potash and phosphoric acid to crops preceding strawberries have proved decidedly beneficial to the strawberry crop.

The familiar crown borer is the most common pest to be contended with. If the methods described in this article are followed this pest does not greatly injure the crop. The white grub, the larvæ of the

May bug, is not known in Oregon. In a few districts of the State—in the vicinity of Mount Tabor, in the Milton-Freewater district, and in one or two other sections—a small white grub does much damage by feeding on the roots. In obtaining plants for setting one should avoid getting them from an infested district. If planting in a district which is already infested plants should be obtained from an uninfested district and set after the middle of June. The beetle which lays the eggs does not appear to fly far, and the pest spreads slowly unless taken on plants.

RASPBERRIES.

All varieties of raspberries find most congenial conditions in Western Oregon. A native blackcap is common and is of good quality, bears well and thrives under cultivation. Red raspberries yield so abundantly that the berries are usually sold here at prices far below those which prevail in the east. Until within a few years a variety known as the Antwerp was the leader among the red raspberries grown for the local markets in Oregon. It is not known whether or not it is the true Red Antwerp. The berries are very large and the yield on good land enormous, but the fruit is soft and unusually sour. This variety has now been almost supplanted by the well known Cuthbert which does well here and yields good, firm fruit liked both for consumption fresh and for canning. Raspberries thrive in Western Oregon on any rich, deep, well drained soil, but soil which holds moisture well is best for the blackcaps.

While it is possible by the use of thorough methods to ship both red raspberries and blackcaps as far east as the Mississippi River, it has been the practice so far to grow them almost exclusively for home consumption and the canneries.

Blackcap raspberries are grown to some extent for drying, and it appears possible to extend quite materially this branch of the industry, as there is a demand for a large quantity of evaporated raspberries at prices which make the production profitable. Rev. Joseph Hall of Newberg, Oregon, took the lead in the development of the industry of producing evaporated raspberries in this State. He has found by more than ten years' experience in the Willamette Valley that while as a safeguard it is necessary to have an evaporator, it is only on rare occasions when the berries cannot be dried in the sun at lower cost than in an evaporator. At the prices paid in recent years the crop has been decidedly profitable, netting from $100 to $200 per acre per year. The Gregg is the variety of blackcap most grown for market in Oregon. It is thought that the Kansas is one of the best varieties for drying. A variety introduced at Springbrook from Kentucky is the most popular in the Newberg district.

It is the common practice in Oregon to raise raspberries in rows about six feet apart, with the plants about four feet apart in the rows. Some growers use a single row of posts for each row with three galvanized wires to tie to. Others use a double row of posts about ten inches apart with one or two wires on each set of posts, and keep the canes between the wires.

THE LOGANBERRY.

This berry originated on the grounds of Judge J. H. Logan at Santa Cruz, California, about 1880. It is supposed to be a cross between the red raspberry and the Aughinbaugh dewberry. It was introduced at Ashland, Eugene, and other places in Oregon soon after 1890 and found especially congenial conditions in the western portion of this State. The plant is an evergreen and the tops are killed by zero

temperatures. The canes or vines are long and similar in habit of growth to the dewberry, but are more robust. The berries are as large as the largest blackberries, but are of the shape of dewberries. They become a light red in color several days before they are ripe and become a dark crimson when fully ripe. Eaten raw, they much resemble the red raspberry in flavor, but are especially pleasing when cooked, as in the process of cooking a rich flavor is developed which is intermediate between the red raspberry and the native dewberry of the Pacific Coast (locally called the wild blackberry). They are much in favor for home canning. Loganberry pies are popular wherever known. The juice can be used for making a delicious summer drink. A new method of utilizing the crop has been developed within a few years, and that is placeing them upon the market in evaporated form. A few years ago Mr. W. K. Newell, President of the State Board of Horticulture, persuaded a few Oregon growers to evaporate some loganberries and he shipped the product to a prominent eastern house which deals in dried fruits in order to have the product tested on the market, particularly for making pies. A demand was at once found for this new product and both demand and supply have been growing. This year many tons of evaporated loganberries have been shipped from Oregon to the east and the supply was not sufficient to fully meet the demand. The prices obtained by the growers for the evaporated loganberries have been from 18 to 22 cents per pound. About five pounds of fresh berries are required to make one pound of evaporated, and the amount of dried product per acre is from 2,000 to 3,000 pounds on good land. Because of the large size of the loganberries they can be picked at less cost than raspberries.

The loganberry is propagated in the same way as the blackcap raspberry; that is, from the tips. To obtain plants throw a spadeful of earth over each tip of the new canes early in the fall. These tips will root and the plants thus started be ready for planting the following spring.

The late Mr. A. M. Aspinwall of Brooks, Oregon, who was one of the most extensive and successful growers of the loganberry, read a paper at the annual meeting of the Oregon State Horticultural Society, held in January, 1908, from which the following extracts are taken:

"Select a deep, rich, dark loam soil if you have it. A clay subsoil is to be preferred to one of sandy or gravelly texture. Drainage is important. If the water does not draw off naturally tile draining should be provided. In planting I prefer the month of April if the conditions of the soil are right. I prefer to set the plants eight feet apart each way. The first year the vines will not interfere materially with cultivation until about the first of August, after which they frequently shoot out 18 or 20 feet, or even more, before winter. They should be trellised during the fall. Build your trellis substantially. Use good strong cedar posts and set them not farther than 32 feet apart in the rows. Securely fasten to these three or four No. 12 galvanized wires, spacing them equal distances apart. Train each vine separately on the wires. Distribute evenly and see that each wire carries its full share of the weight. If practicable have the trellised rows run north and south; thus the vines are protected from the prevailing winds of the Willamette Valley and the fruit ripens more evenly. As a rule the loganberry needs little pruning. Do not thin them out until more than a dozen canes appear in a hill, and then remove only the weaker canes. Cultivation should be thorough and frequent. I prefer to plow both in the fall and in the spring, turning the furrow against the row in the fall and into the center in the spring. Then use the disc or spring-tooth harrow until in July. Start the cultivation

Walnut Grove, Lane County.

as early in the spring as the ground can be worked and go over the surface at least once each week. As the season advances see that the harrow is set more shallow with each cultivation and follow it each time with the clod-masher. Have a careful trainer go ahead of cultivator to turn in all arms that dangle out from trellis to prevent the team from breaking them. In the Willamette Valley the first berries are usually ready for gathering about the middle of June. The ripening will increase steadily until in July when the full harvest is on. The harvest continues six weeks during which time the vines should be carefully gone over every alternate day and the ripened berries gathered. Do not allow the fruit to get over-ripe. When the season for gathering loganberries arrives everything should be in readiness—plenty of crates on hand and made up, and enough pickers and attendants engaged. It requires about ten good pickers for each acre of loganberries."

Burbank's Phenomenal berry is so much like the loganberry that a casual observer does not see any difference. The berries are said to be better shippers than the loganberries, but the yield is less and Phenomenal plants are no longer in demand for planting in Western Oregon.

BLACKBERRIES AND DEWBERRIES.

The native dewberry of Oregon, commonly called the "wild blackberry," grows abundantly in open woods in Western Oregon, and is highly prized for household canning. It thrives under cultivation but is not grown to any extent in that way. The flavor when cooked is unsurpassed by any other berries of its kind.

The leaders among the varieties of standard blackberries cultivated in Western Oregon are the Snyder and the Kittatiny. The rows of blackberries should be eight feet apart, and plants may be set four to six feet apart in the rows. The manner of supporting the canes is the same as with red raspberries. Very few standard eastern dewberries are grown in Oregon, but a number of varieties of blackberries with running vines are grown to some extent. The most common of these is the variety known as the Evergreen. The foliage and habits of growth of this plant are quite distinct from other blackberries and dewberries, but the fruit is very similar to other blackberries. The bearing season is long and the yield on moist ground very great. The vines are rampant growers, and if neglected become a nuisance. If handled in the same manner as dewberries or loganberries and kept in check by pruning, the fruit is improved in size and the variety is profitable, as the berries of this variety are well liked by canners. The Mammoth blackberry is also a plant of trailing habit and requires about the same method of treatment as the loganberry. The fruit is large, soft, and of good flavor. It ripens early or about with the Lucretia dewberry and the flavor is more like that of standard blackberries than is the case with ordinary dewberries. The Himalaya blackberry is another of the trailing type of blackberries. It is said to be a better shipper and a much better bearer than the Mammoth. Neither variety is grown extensively in this State.

All of the blackberries need deep, rich soil which naturally retains moisture well. This is especially true of the standard and evergreen varieties as they ripen late in the season and on moist soil continue to bear until late in the fall. The soil should be well supplied with humus and the supply be maintained by growing winter cover crops of vetches to be turned under as early in the spring as the ground is in good working condition. Cultivation should be thorough and be maintained until the fruit begins to ripen.

CURRANTS AND GOOSEBERRIES.

The climatic conditions are well nigh ideal for these berries in Western Oregon. The main demand for gooseberries is that made by commercial canners, and it is not safe to plant extensively without first making a contract with a cannery for a term of years. The Oregon Champion, a variety which originated in Western Oregon and is now well known in many other portions of the United States, is grown almost to the exclusion of other varieties. Its large size suggests the probability that it is a cross between European and American varieties but it is free from mildew.

The same varieties of currants are popular here and in the east, and the methods of planting and caring for gooseberries and currants are the same here and in the east.

CRANBERRIES.

Along the Oregon coast there are tracts of land adapted to cranberry culture, and in Coos and Tillamook counties the industry of growing cranberries for market has been established. Mr. C. D. McFarlin, who established the industry in Coos County, commenced planting in 1885. In 1891 he had nearly five acres in bearing, and he reports that since that time there has never been a year in which his net returns have been less than $200 per acre, and in some years the profit has reached nearly $400 per acre. He states that cranberries grown in Coos County contain more starch and less acid than those grown in the east and make a better flavored sauce.

The successful cultivation of the cranberry requires a peat soil free from sediment, in a locality where clean sand can be readily obtained, and so situated that the tract can be flooded at will. Mr. McFarlin advises every person who thinks of engaging in cranberry culture to get a copy of "Cranberry Culture," by J. J. White, published by the Orange Judd Co., New York City.

Apple and Pear Market in Europe, and Prospects of the Northwest Growers in that Market

By HON. H. B. MILLER, *Consul at Belfast.*

IMPORTATION OF APPLES INTO THE UNITED KINGDOM, WITH COUNTRIES FROM WHICH THEY COME.

FRUIT NOT LIABLE TO DUTY.

Apples, Raw. From—	1905.	1906.	1907.	1908.
Germany	$ 19,385	$ 70,390	$ 20,890	$ 7,695
Netherlands	141,105	64,480	100,580	118,220
Belgium	121,800	126,395	176,560	475,265
France	276,440	80,585	107,240	365,420
Portugal	220,165	228,395	171,585	212,440
Spain	122,760	17,780	81,880	5,165
United States of America	4,684,340	4,342,190	4,299,100	3,649,215
Other foreign countries	1,020	1,040	1,935	1,935
Channel Islands	61,445	52,810	28,520	24,950
W. Australia	.....	300	2,920	2,295
S. Australia (including N. Ter.)	139,770	117,715	59,115	264,115
Victoria	122,175	106,990	218,005	140,555
New South Wales	1,000	1,355	3,535	6,970
Queensland	.....	.....	.....	25
Tasmania	894,590	666,505	1,278,000	1,114,530
Canada	3,519,750	2,889,910	4,604,370	4,007,780
Other British Possessions	320	535	2,400	1,440
Total	$10,325,965	$8,767,885	$11,156,635	$10,398,515

GREAT BRITAIN.

Great Britain is not in a general term an apple-growing country. Ireland is perhaps the best apple-producing section of the empire, but its production does not exceed over 50,000 barrels. The apples grown in Ireland are especially prized for cooking purposes, and there is no doubt but that the production of cooking apples will tend to increase, but it will be many years before it will have any appreciable effect upon the market. The Department of Agriculture is endeavoring to encourage apple growing by establishing experimental orchards and giving instruction in horticulture in various districts.

The table given shows the importation of apples into Great Britain for four years, together with the countries of their origin. A review of the apple importation into Great Britain for a period of years prior to this schedule, shows that for a number of years the annual importation amounted to between five and six million dollars. In 1892 the imports for some unknown reason nearly doubled, and reached about $10,000,000, and since that time they have remained close to that value, varying only slightly either way, and for the last year of statistics, 1908, the total imports amounted to $10,398,500. It seems clear, therefore, that there is little likelihood of any decrease in this quantity of imports of apples into Great Britain. There is a fair prospect, under favorable conditions of industrial prosperity, of this amount being considerably increased.

IMPORTS FROM THE UNITED STATES.

The United States of America shares in this market to the extent of something over one-third, averaging for the past four years $4,000,000

Bartlett Pear Trees. John Gore's Orchard, Medford.

per annum. Canada is now our strongest competitor, sharing about equally with us in the amount of exports. Belgium and France are the next in trade, Australia and Tasmania following. We are not competitors with the Australian and Tasmanian apple, because they come into the markets at a different time of the year, mostly during May and June, while our apples are almost entirely fall and winter varieties.

CHARACTER OF FRUIT PACK.

The great bulk of apples in the markets of Great Britain are shipped in barrels and, measured by the Pacific Coast standard of quality and pack, are of a very inferior grade. The consumption of apples in Great Britain, however, is largely for cooking purposes, and on this account it consumes an enormous quantity of inferior and low grade stock. The bulk of these apples are bought by brokers from the orchard, thrown into the barrels in an indiscriminate and careless way, and shipped without any thought or care for the reputation of the business. This style and method of handling fruit, when it is met by the superior skill and care of growers and shippers of the North Pacific Coast, will be very readily discovered in the trade.

FURTHER PROSPECTS FOR THE OREGON APPLE.

If the Pacific Coast orchardists continue to produce their present high quality of stock, and improve upon their methods of handling same by superior packing and enlarging and improved organizations of associations for reliable grading and marketing, there seems to be no reason why they should not command the largest part of the apple trade of Great Britain. The most serious difficulty at present standing in the way is not a sufficient quantity, with a well established reputation of quality and grading, together with too high cost of transportation. The reputation of Oregon apples in the British market now stands highest of all that are shipped from any part of the world. There is no question whatever concerning the possibilities of the northwest producing a quality of fruit that will command this market. A little better understanding in relation to the varieties for the market in future plantings would be of great value. The taste of the British apple consumers demands a fruit filled with juice; a dry apple will never be popular here. Sufficient acid to make it a good cooker is also important.

TRANSPORTATION.

The present cost of transporting a box of apples to the European market from the Pacific Coast is 75 cents.

The great market for the apples of the northwest in Europe cannot well begin until the completion of the Panama Canal. Considerable quantities of good grade stock will find a market here from now on at a profitable rate, and shipments ought to increase very materially every year, but the market for Pacific Coast apples is not likely to reach into the million dollar class until the completion of the Panama canal. By that time, however, shipments ought to reach in the markets of Europe from three to six million dollars per annum, and cost of transportation should not be over 35 cents per box.

If proper attention is given to this great future market by the states of Oregon, Washington, and Idaho, the bulk of these shipments can be made from Portland by refrigerator steamers at a rate not to exceed 50 per cent more than the regular merchandise steamer rate. There is no apple growing district of equal value in production anywhere on the North American continent as close to tidewater as the

territories of Oregon, Washington, and Idaho, for which Portland can be the shipping center.

Apples are coming into the British market in January and February from the Pacific Coast badly injured by freezing; this of course will not occur in shipments by steamer after the opening of the canal.

VARIETIES OF APPLES.

The following are the leading varieties of apples being imported into Great Britain with the selling value according to the standing in the column:

Grimes Golden.
Yellow Newtown Pippin.
King.
Northern Spy.
Jonathan.
Russet.
Baldwin.
Gano.
Ben Davis.

There are many other kinds in the markets both in barrels and boxes, but it is safe to take the above as all being standards.

Kings, Jonathans and the best of the Baldwins are marketed before the first of the year.

IRRIGATED APPLES.

This year (1909) all the apples from irrigated districts have proved very unsatisfactory, especially those arriving after January first, as from one-quarter to one-third are more or less decayed.

I have seen large, fine looking Winesaps and Rome Beauties, and other equally hardy varieties from irrigated districts, arriving in a bad state of decay, and dealers have entered a strong complaint.

I find that apples from non-irrigated districts coming into the markets after the first of the year, uniformly bring the best prices.

GERMAN APPLE MARKET.

IMPORTATION OF APPLES INTO GERMANY FROM VARIOUS COUNTRIES.

	Figures given in bushels.		
	1907.	1908.	1909.
Belgium	478,632	820,608	509,568
France	187,200	220,416	187,200
Italy	3,329,376	298,176	3,329,376
Netherlands	906,964	998,160	906,864
Austria-Hungary	2,140,656	3,005,472	2,140,656
Switzerland	1,193,136	2,986,464	1,193,136
Servia	168,576	.....	168,576
United States	442,992	207,600	442,992
Australia Confed.	75,888	64,272	.....
Total importation	8,983,632	8,640,816	8,983,632

NOTE.—The figures for 1909 are for the first eleven months only.

The value of imports of fresh apples and pears into Germany has been between five and eight million dollars per annum for the past ten years. The share of the United States in this trade is comparatively small, but I am of the opinion that it could be very materially increased by a proper effort on the part of the Pacific Coast growers to advertise and push their products.

Germany is making a creditable effort in the production of apples, and the number of apple trees planted in the empire is over fifty-two millions.

IMPORTATION OF PEARS INTO GERMANY FROM VARIOUS COUNTRIES.

German reports place imports of pears and quinces together in the following table:

	Figures given in bushels.		
	1907.	1908.	1909.
Belgium	349,300	300,950	459,600
France	208,700	.....	.....
Italy	173,900	181,550	278,950
Netherlands	402,100	158,100	308,300
Austria-Hungary	944,650	432,450	1,570,000
Switzerland	71,750	60,600	305,000
Total importation	2,159,950	1,278,500	3,009,650

The average import price per 100 kilos (220.4 lbs.) in 1907 was M. 14.82 ($3.53), in 1908 M. 13.13 ($3.12) and 1909 it was M. 17.34 ($4.12).

The average import price in 1907 and 1908 was about 1½ cents per pound, and in 1909 nearly two cents per pound.

From this table it seems that the United States has no part of consequence in the pear trade.

Not having had an opportunity of a personal inspection of the German fruit trade, I am not able to give detail information that would be of value either in the apple of pear markets.

There are over twenty-five million pear trees in Germany.

IMPORTATION OF PEARS INTO THE UNITED KINGDOM.

Pears, Raw. From—	1905.	1906.	1907.	1908.
Germany	$ 59,080	$ 117,830	$ 87,425	$ 9,390
Netherlands	138,975	89,895	199,865	64,415
Belgium	221,455	327,630	611,715	422,430
France	1,019,205	1,736,055	1,190,270	1,415,310
United States of America	471,490	437,010	132,210	470,185
Other foreign countries	6,650	4,280	11,570	5,465
Channel Islands	19,240	52,595	30,845	29,570
Cape of Good Hope	6,440	20,395	35,365	56,100
Australia	44,560	23,765	75,240	23,290
Canada	51,965	51,905	18,540	83,455
Other British possessions	25	10	10	10
Total importation	$2,039,085	$2,861,370	$2,393,$55	$2,579,620

Pears to the value of two and a half million dollars are annually imported into Great Britain. This amount has been remarkably constant for the past five years.

France has a little over half of this trade with Belgium usually second and the United States third. The Pacific Coast pear is becoming well established and the Oregon fall and winter pears are beginning to make a first class reputation.

More of them is all that is required to enlarge the market, as dealers everywhere are calling for more of the Oregon fall and winter pears and offer every encouragement to the increase of the market. They do not speak so encouragingly of the market for summer pears.

Oregon can produce these pears that are particularly desired in this market, and in the planting of orchards considerable study should be given to varieties capable of good production in the different districts and fitted to this trade.

The most profitable will be those suited to the holiday trade. A pear satisfactory to the Christmas trade will have very little opposition in the British markets because the French and Belgian are difficult to keep so late, and as soon as pears begin to soften the dealers do not care to handle them.

One of the finest openings for fruit, and one that I do not hestitae to commend to the attention of Oregon horticulturists is this British market for winter pears.

Fruit commission houses have been paying from two to three cents each for pears in twenty pound boxes of from forty to fifty pears each.

The following varieties are common sellers: Clairgeau, Hardy, Comice, Anjou, Easter, American Duchess, Arenberg, Charles Ernest, (this is an exceptional favorite as a winter pear), Magnifique, Glout Morceau (is a high priced and poular winter pear), Josephine de Malines, (is one of the best winter pears).

This season the Keiffer has been a splendid seller. Small pears, however luscious, do not seem to answer the demands of this market, such as Winter Nelis.

PEARS FROM SOUTH AFRICA.

During the latter part of February this year, large consignments of Bartlett pears came to the British markets from Cape Town, South Africa, under the name of "Bon-Chretien," also known in the street as "William Pears." These pears were introduced from France to England by a man by the name of William, and therefore pass under his name here. The same pear was introduced into America by a Mr. Bartlett, and hence in the United States is known as the Bartlett pear. Thousands of boxes of these pears are consigned into the British markets now, and will continue to come until some time in May. They come in small single layer boxes of twenty-eight pears each and sell here at $1.00 per box from the commission houses. This fruit comes by steamer, a distance of over six thousand miles, requiring about twenty days for the trip from Cape Town to London. Those that I have seen have been landed in fine condition. Unless Oregon can produce a pear that will compete successfully against the Bartlett for the spring season, it would not be advisable to grow pears for this market to be delivered here after the end of January. The best opportunity seems to be to produce something good for the holiday trade.

The Royal Horticultural Society of Great Britain is to a large extent responsible for the development of horticulture in South Africa. They are taking great interest in the production of fruit for the British markets in the various British colonies, and the results of their efforts are showing good returns in many cases.

APPLES AND PEARS IN FRANCE.

Importation of apples and pears into France, figures given in bushels:

From—	1907	1908
Germany	5,930	——
Austria-Hungary	10,080	——
Turkey	2,275	——
United States	82,875	19,765
Canada	1,245	790
Other countries	2,340	695
Total	103,740	21,250

I have been able to get very little information concerning the French market. From the above table you will observe that so far as imported apples and pears are concerned the market for foreign stock is not very great. My advices indicate that no pears are imported into France from the United States, and those that are imported are of two varieties, "Amorelle" and "Blanche." Horticulture in France is a most pros-

pering industry, and besides growing fruits for their own markets, they are extensive exporters to various European districts. In October, 1909, a technical board of horticulture was created and attached to the ministry of agriculture. The purpose of the board is to promote the development of horticulture in France.

In the European markets, especially in pears and the more delicate fruits, France has a great advantage over the United States and in arranging for marketing our fruits in this part of the world, care should be taken to avoid such plantings for this trade as are likely to be ruinous against the French product. A special study should be made of the French productions in order to get a thorough understanding of this phase of the subject.

GROWERS AND ORGANIZATIONS.

It is clear that any apple growing section, in order to make a permanent success, must establish and maintain a standard of fruit and pack that will fix its reputation high and substantial in the markets of the world. If this part of the business is left to commission men or brokers it will fail, because their interest is only for the season, and they have no investment in the reputation in which the grower's entire capital of orchard land and life's occupation are invested. The quality of his product, the grade of his pack, the method and system of placing his output in the market, which fixes reputation, makes his capital invested, good or bad. These things are as much his business as the growing of the fruit. Experience has proven that these features of the business can best be carried on by associations. The larger, stronger and better the association, the more the profit, and the greater the value of the orchard investment. In order to be an important factor in the European markets, the shipping organization of apple growers must be large and strong financially and otherwise, and should control a million boxes or more of fruit. A single ship from New York has just brought into Liverpool over thirty thousand bushels of apples, and this is only one of several ships clearing every week carrying fruit during the season.

The British markets consume between ten and twelve million dollars' worth of imported apples each year with an increasing tendency. Why should not the district that has the highest reputation in this market for its fruit, increase to an enormous extent its exports? Oregon apples are the choice of all, and some capable organization that would take up the matter of making a careful study of the markets of Europe, and how to provide for them, would be able to add millions to the wealth and much to the happiness of the people of the entire northwest coast of the United States.

The Ontario parliament of Canada, a year ago passed an act providing for grading, marking and inspection of apples, and for a fine for falsely marking packages. This has had a good effect in improving the grading and has brought better returns in cash. The formation of an association of Ontario fruit growers, and establishing of general packing houses, and uniform packing guaranteed by the association has had a still better effect, and the association product brings the highest price in the market.

Already the Hood River and Rogue River associations in Medford and Grants Pass have their fruit in the markets here, and the dealers are much pleased with their products, brands and grading. These various local organizations should remain intact and form a general selling agency with supervisory powers over methods and quality of pack. The association method will be much better than a general law on the subject, and should be relied upon as the important thing in regulation of the business, rather than a State law.

EUROPEAN MARKETS FOR OREGON FRUITS

EUROPEAN MARKETS FOR OREGON FRUITS.

Read by HON. H. B. MILLER *before the* 1910 *annual meeting of the Oregon State Horticultural Society. This article supplements the preceding one by Mr .Miller.*

GREAT BRITAIN.

Of all the European markets, Great Britain offers the most inviting prospect for the products of the orchards of Oregon and the Northwest. The annual importation of apples alone into Great Britain ranges between ten and twelve million dollars in value, one-third of which now comes from the United States, with a very small per cent from the Pacific Northwest. Great Britain imports annually pears to the value of between two and three million dollars. A very small sprinkling of this importation of pears comes from the Northwest of the United States. In fact the Oregon pear is just beginning to become known in the more important markets of Great Britain. Wherever the Oregon apples and Oregon pears have been introduced into these markets they have established a splendid reputation. The dealers everywhere say that the Oregon apples are far superior to those received from any other country or district..

There should be no trouble in marketing great quantities of Oregon Bartlett pears in British markets.

FRESH PRUNES AND PLUMS.

The markets of Great Britain are beginning to open for fresh prunes and plums from the Northwest. There are now to be found in nearly all of the leading fruit stands throughout Great Britain, Coes Golden Drop plums and Oregon prunes, selling at retail from 16 cents to 20 per pound. The total importation of raw plums into the British markets is $2,150,000, largely from France, and mostly of the variety which we know as the French prune. There was also imported into Great Britain from France, fresh cherries to the value of one million dollars.

All raw fruits are imported into Great Britain without duty, and the total value of all classes of fruits imported into Great Britain without duty amounts to $53,000,000 per annum. In addition to this is a very large importation of fruits that pay duty.

In looking at the tremendous imports of fresh fruits into Great Britain, it must be borne in mind that there is no month in the year when they are not importing fresh fruits from some country. Fresh pears, peaches and apples come into the markets from South Africa in February, March and April. Similar fruits reach the same market from Australia, Tasmania, and New South Wales in May, June and July. Fruits from Oregon in the markets of Great Britain compete with those from the eastern part of the United States, from Canada, France, Belgium, Spain, Portugal, and the Netherlands. Our apples compete with apples from all these countries, but more particularly with those from California, Canada, and the eastern part of the United States.

Our pears compete with the early ones from California, the eastern part of the United States, but primarily with those from France.

There is generally at the present time in all of the fruit markets of Great Britain a strong demand for increased importation of Oregon pears; more especially of those coming into the markets in November and December. I consider the opportunity for the marketing of Oregon pears in the British markets from present appearances far more inviting than any other class of fruits which we can produce.

I have met with so many surprises in the matter of raw fruits in the British markets from all parts of the world that I am not prepared to assert that even the Oregon grape and cherry will not some day find a profitable market in the British Isles.

When you consider that summer peaches are delivered in the British markets from South Africa in splendid condition by refrigerator ships, taking from 17 to 20 days for the trip, it is not too much to expect that on the completion of the Panama Canal, we may be able to ship from the Northwest, our most delicate fruits in the fresh state by refrigerator steamers.

It would be a surprise to the Oregon fruit grower to visit the fruit markets of Great Britain as well as those of all the European countries, to discover the vast quantity of inferior, immature, scabby, scaly and rotten stuff sold as fresh fruit. A very large per cent of the fruit consumed in the European markets would not be gathered from the ground by an up-to-date Oregon fruit grower. This class of fruit is not only consumed by the poor people, but represents the quality of the large consumption of fruit by the middle and fairly well-to-do people. A very large proportion of the fruit shipped into Great Britain from the United States is of an inferior quality, gathered from the ground in a most indiscriminate way, put into barrels, and shipped regardless of the reputation of the grower. Much of it is covered with scale, scab, and is also wormy. Oregon is making its reputation by the quality and the character of the pack of the fruit shipped. This is giving it the highest price for its product, and making a profitable and substantial market. It is important that this standard of quality fruit, and character of package be permanently maintained.

Our strongest competitor in the apple markets of Great Britain will be for many years to come, Canadian fruit. By organizations and associations for marketing, and by laws regulating standards, by examination and government inspection, the Canadians are improving their reputation and markets in Great Britain, and if in the re-organization of the fiscal system of Great Britain, which is now being much discussed, there should be a preferential tariff established on fruit in favor of British possessions then Canadians would still have another advantage over the United States apple trade in Great Britain.

Oregon and the Pacific Northwest now hold the best position in the apple markets of the British Empire, and if through proper organizations for producing and marketing their fruits they take advantage of every opportunity in reducing the cost of transportation and marketing methods, I am convinced that for many years to come they will be able to command the best apple markets of the country.

The possibilities in the British markets for the Oregon apple are previously been led to believe. It is a mistake of the horticulturalists of previous been led to believe. It is a mistake of the horticulturalists of the Northwest to imagine that their markets for fresh fruits in Europe are to be confined to the winter apple. There is no reason whatever why the Oregon Gravenstein, and apples of a similar quality and season can not find a profitable market in Europe. This year quite a few Oregon Gravensteins are to be found in the British markets, bringing

the highest price, and reaching the trade in perfect condition. They have been selling by the commission houses at $3.00 per box, the consumer paying four cents each. California Gravensteins are also in the market, but are not the choice when Oregons can be secured.

DRIED AND PRESERVED FRUITS, ETC.

The total imports of dried plums and prunes such as are produced in the Northwest into Great Britain, amount to $1,285,000. The total importation from the United States of fruits preserved with and without sugar other than dried fruits is about $1,500,000, the larger proportion of which comes from California. There is imported from the United States, prunes, plums, and dried fruits to the value of $335,000. largely the French prune from California, with a small proportion of the Oregon prune from the north.

Dried currants pay a duty of 48 cents per cwt. Dried figs, plums, prunes, raisins, etc., pay a duty of $1.68 per cwt. Preserved fruits also pay a duty of $1.68 per cwt.

FRANCE.

France is primarily a fruit producing country, producing pears and apples, prunes and other fruits, not alone for her own consumption, but extensively for exportation. Our markets there, however, are extremely limited, and even the surrounding countries export very few apples and pears into France. The total importation for table use in 1908 amounted to about 25,000 bushels, 20,000 of which came from the United States.

The apples from the United States pay a duty into France of about 10 cents per bushel. This is the minimum tariff rate which the United States enjoys. The maximum rate is just double this amount. Fresh pears pay a minimum duty of 12½ cents per bushel. Dried apples and dried pears pay per cwt. four times that of the fresh fruit. Dried prunes pay a duty of five times per cwt. of that on fresh apples.

The total exports of table apples and pears fresh from France in 1909 amounted to something over $2,000,000. One and a half million dollars' worth was in pears exported into Great Britain. Dried prunes exported amounted to about $2,500,000, and the value of nuts exported amounted to $2,700,000. This does not include almonds, chestnuts, and peanuts. Statistics in France give the total production of apples and pears for table use for 1907 at about $5,000,000. The production of apples and pears for cider and perry making amounted to $12,000,000. Plums and prunes amounted to $4,500,000. What fruit is imported into France of such varieties as would be produced in the Northwest come into the markets at a different time of the year from the French fruits and at a different time of the year from those which we could export to that country. It seems to me, therefore, that it is hardly worth while to anticipate any market in France for our fruit products.

The total quantity of cider manufactured in France in 1908 amounted to 100,000,000 gallons.

GERMANY.

Next to Great Britain, Germany offers perhaps the best market for our fruits. This market, however, has not yet been as well supplied or exploited as the market of Great Britain with fruits from the Pacific Coast of the United tSates.

APPLES.

The greater per cent of apple importations comes from Italy, next Austria-Hungary, next Switzerland, then the Netherlands, then Bel-

gium, then the United States. It will be observed, however, that the countries immediately surrounding Germany are the ones producing the imported fruits for Germany's consumption.

PEARS.

In pears, the total importation into Germany is between two and three million bushels, mostly from Austria-Hungary, with very few from the United States.

With its population of 56,000,000 of people, Germany, for instance, consumes 10,000,000 bushels of apples raised in other countries, while the United States secures a trade there not to exceed half a million bushels. There is no question whatever as to the possibilities of extending the market for good Oregon apples to a wonderful extent in Germany. The great bulk of the apples imported into Germany is what we call culls on the Pacific Coast. Immatures, unripe, ill-shapen, scabby and small apples and pears are to be found in all of the principal cities of Germany in the fruit stands and peddling carts. It is quite a surprise to see well-to-do people purchasing this fruit, and consuming it. Immense quantities of what we know as the French prune are marketed in the green state in a miserable dirty condition. If Oregon apples were put upon the German market at a price that would be very satisfactory to the growers, under a well organized and extensive system of marketing at a price within the range of even the ordinarily well-to-do people of Germany there is no doubt as to the expansion of our trade. The vast majority of apples consumed in Germany are grown in Italy and Austria-Hungary. I am not familiar with the condition of production in Italy, but the apples produced in Austria-Hungary are grown in a most desultory fashion. The apple trees are mostly old trees, and almost entirely uncultivated. They are grown along the highways mostly and bordering the fields, and where they are grown in the fields they are scattered about in a very irregular way and are grown on very tall trees with cattle and stock of different kinds grazing beneath the fruit. Apples grown in Germany are also produced in the same careless way. Apples are merely and adjunct to the other farming, and are not grown or marketed with care, skill, or systematic method.

Germany has the appearance of the most thrifty, industrious, and prosperous country of Europe. It is certainly extremely progressive, and developing in a most substantial way. All of the conditions would seem to indicate that it is one of the best foreign markets to be cultivated, especially for our apples.

According to sections 47 and 48 of the German customs tariff, the import duties per 100 kilos (220.4 lbs.) upon fresh and dried fruits imported from the United States and other countries at present enjoying the minimum rates are as follows:

FRESH FRUIT—APPLES, PEARS, QUINCES.

(1) Unpacked—From Sept. 1 to Nov. 30	Free
From Dec. 1 to Aug. 31, M. 2, 220 lbs.	48 cents
(2) Packed—	
(a) By mail in packages of 5 kilograms (11.02 lbs.) or less, gross weight	Free
(b) In sacks weighing at least 50 kilos (110.231 lbs.) gross weight—From Sept. 1 to Nov. 30	Free
From Dec. 1 to Aug. 31, M. 2, 220 lbs.	48 cents
(c) In other packing—	
In single covering M. 3.20. 220 lbs.	76 cents
In more than one cover. M. 5, 220 lbs.	$1.19
Apricots	Free

PEACHES.

(1) By mail in packages of 5 kilos (11.02 lbs.) or less, gross weight ..... Free
Otherwise, M. 2, 220 lbs.

DRIED FRUIT.

Apples, pears, apricots, peaches, M. 4, 220 lbs. ..... 96 cents

It will be observed that in order to secure the minimum tariff rate on fresh fruits of 76 cents for 220 lbs. it will be required to pack the 220 lbs. of apples in one package with one covering. This seems to be the one serious problem in our securing a great market in Germany for our apples and pears.

GREAT BRITAIN AND GERMANY.

Great Britain and Germany together offer a most promising field for the markets of apples from the Northwest; but these markets will not hunt for our fruit. Our fruit must hunt these markets. In what way is this problem of marketing the fruits of the Northwest in Europe to be taken up? What system and method is necessary and best to cultivate this trade, secure it and hold it? That is the most important problem before the fruit growers of this country. If we need these markets and want them; if they are important to our industry; if they are essential to the expansion and welfare of the horticultural interests of the Northwest, some systematic organized method must be devised to advertise our products, to supply the trade and maintain permanent, substantial, and direct commercial relations between the dealers of Europe and the growers here. I expect no permanent market for our products in Europe to justify our great production until some such organization is permanently created. I do not mean by this that nothing can be done in any other way. I do not mean to intimate that our trade with Europe will not grow to some extent without it, but I do insist that nothing satisfactory, permanent or extensive in the matter of European markets will be established for our products until the growers create a proper organization to that end. The cost of transportation in the completion of the Panama Canal will be reduced at least one-half. Many of our more delicate fruits will readily find a good market in Europe when this line of transportation is established. There will then be no reason why direct connection and direct shipments can not be made with enormous exports from the city of Portland to all the leading fruit markets of Europe. In preparation for this great world's change in trade and for our great opportunities in the Old World, we ought to be sending our products into that country sufficiently to establish their reputation, and we should have agents making a careful study of conditions, and using every possible method for introducing our products into all the important markets. This can be done now on a business basis with a substantial profit to the growers, provided they have properly organized machinery for carrying on the work, and by the time shipments begin through the Panama Canal, our trade will be so well established that we will be able to hold it and increase it with the reduced cost of transportation against the world.

HOW TO IMPROVE THE EUROPEAN MARKET FOR OREGON FRUITS.

There are so many things to be done in order that the fruits of the Northwest may receive proper consideration in the European markets that I feel timid about specializing because of the number of things which I am sure will be overlooked.

ADVERTISING.

It is of the utmost importance that the splendid fruits of the Northwest should be properly advertised in the markets of Europe. It

is the common thing to see Oregon apples labeled in the fruit stands, "California Fruit." It is almost the universal thing to see Oregon prunes labeled "California Plums." It is equally common to see the finest Rogue River pears marked "Pears from California." Everywhere our fruit fails to get its proper recognition on account of the general popularity of California fruit, and the fact that it is sufficiently advertised to make the labelling of it an advantage in its sale. The dealer will tell you that the Oregon apple, the Oregon pear, and the Oregon prune is superior to those received from California, but at the same time will proceed to label the Oregon products California fruit.

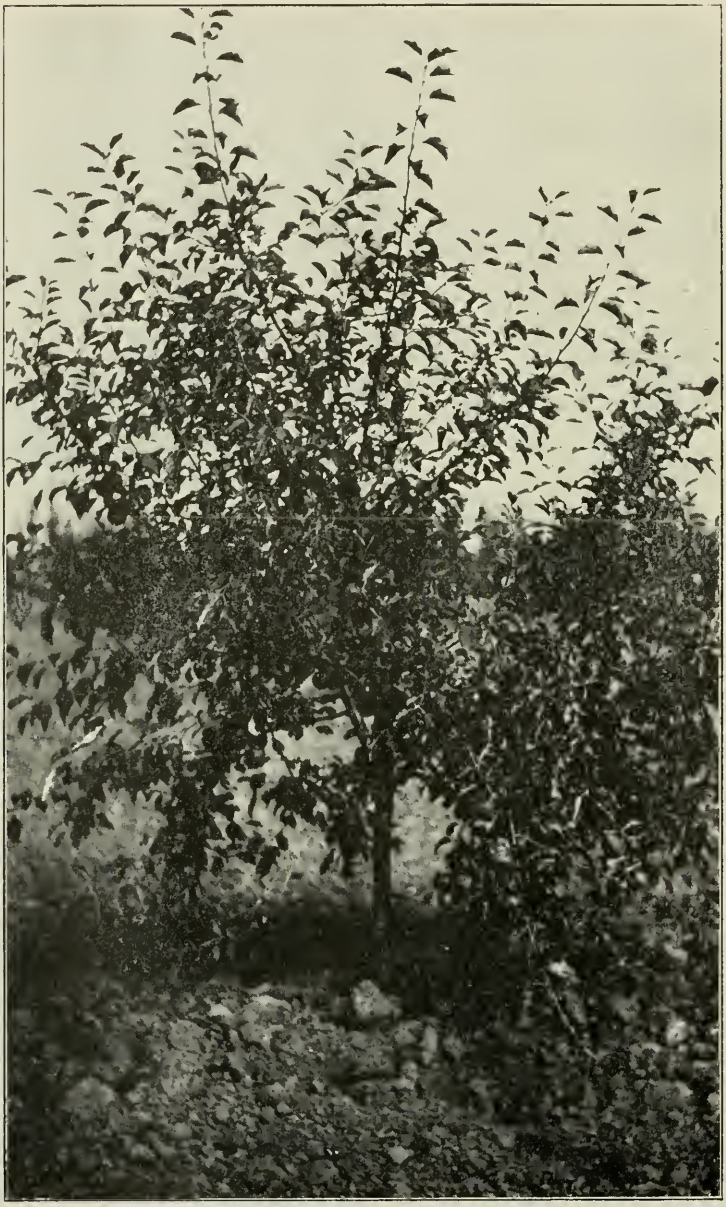
Nearly all the fruit from the Pacific Coast in the European markets, although received in small packages, is sold by the grocer and the fruit dealer, and at the fruit stands, by the pound or the piece. The man who sells to the consumer buys by the box, and all of them are especially anxious to advertise the product as either American or California. They have these placards printed "American" and "California" in large and attractive letters and keep them on hand for their fruit sales. It would be of great value to the Oregon product to have a small neatly printed placard "Oregon Apples," "Oregon Pears," "Oregon Plums or Prunes," etc., that could be placed in the boxes that go into the European markets, or sent to the dealers for distribution. This would perhaps be one of the best means for advertising. Other advertising methods, however, should not be overlooked.

Another important feature in the matter of enlarging the market for fruits of the Northwest, and perhaps the most important of all, is improvement in some form, of methods of getting this fruit to the market, and providing it to the consumer at a less cost. Sixteen cents per pound, for instance, is rather a high price for the green Oregon prune. The price of apples and pears to the consumer ranging from 4 to 10 cents each is rather exorbitant, and hardly compatible with the plan of enlarging the market. One of the first steps in the matter of extension of the markets for Oregon fruits in Europe, is to send a representative into the markets of Europe to study all of the conditions, and to superintend the whole plan of marketing the fruit. Our fruits are now marketed by people who only have a temporary interest, and that is to get as big a price as possible for the present season.

The proper marketing of our fruits, and the establishment of an intelligent representative leads into the question "Organization of the Growers." I have no hope or faith whatever in the substantial and successful expansion of our markets in Europe in any other method than by proper organization of the growers for that purpose. Until that is accomplished everything will be spasmodic and uncertain.

There was a splendid example of the benefits of proper organization in protecting the British market for bananas by the great "Banana Import Organization" during the past year. There was a great shortage in the supply of bananas during a large part of the past season, and a splendid opportunity for a temporary profit to be made by this organization that controls the importation of bananas into the British market. On account, however, of their interest in the permanent consumption and maintaining a substantial market, they absolutely refused to raise the price of bananas, and compelled them to be sold at the same price as though the market were perfectly supplied, and the result has been entirely satisfactory to the organization.

The primary work, therefore, as it seems to me, necessary to the enlargement of the fruit markets of the Northwest in Europe, lies in the perfection of an organization of the growers for the purpose of handling the European market primarily in their interest. This organization must find methods of transportation and marketing that will be of the most economical character. They must have representatives in Europe to watch and care for the trade and devise every possible means for extending and improving it.



Jonathan Apple Tree in Orchard of B. M. Sproat, Reedville, Oregon. Set January, 1906; photographed fall of 1909; yielded one box apples, 1909.

THE APPLE IN OREGON

Extracts from Bulletins of the Oregon Experiment Station, Prepared by Prof. E. R. Lake.

THE PROBLEM OF PLANTING.

Before the question of what to plant arises in the mind of the person about to engage in the growing of the apple, there have come those other questions: Shall I grow apples? If so, to what end? For home, local market, or shipment? And it is presumed that to these suggestions a final answer has been given. Whether this reply makes the one or the other object the purpose of the planting matters little, so far as the real work of planting and future care is concerned, though too often the plants upon which a crop is grown for home use are given little or no intelligent, appreciative attention. There is no adequate excuse for the usual neglect of the trees, shrubs, and vines that produce the fruits for home use. Only clean, healthy, vigorous trees may be expected to produce choice fruit, and what tiller of the soil would that his family should have fruit of an inferior quality? The plea that is usually offered in extenuation of the offense of an ill-kept, fruit bearing plantation is that "We can't take time from the regular work to look after it." This is the merest absurdity. An essential part of man's duty to himself and family is to maintain good health. No single part of our usual diet does more to promote this condition than wholesome fruit. It is only with the best of health that the soil tiller may expect to successfully compete with his fellow; hence how important that he avoid, as far as possible, all demands upon the physician's services, for such demands mean a lessening of his earning capacity, as well as an increase in financial expenses. Not alone this, for the growing of good fruit for home use gives a tone, keenness and enthusiasm to the family such as many times repays the outlay. The man, woman or child who works much out doors craves a good supply of fresh fruit, and such an one works harder and more cheerfully when liberally supplied with it. Reasons enough, certainly, why the fruit garden about the home should be cultivated and the plants otherwise well treated.

And thus it should appear evident that there is really no essential difference between the problem of planting for home and that of planting for the market, except so far as relates to the varieties most desirable for the particular purpose in view.

Location.—From several points of view the problem of where to locate the apple orchard is one of considerable moment. Now that good, clean fruit, free from worms and fungi, is to be secured only at the expense of liberal and effective spraying, it is important that the orchard be located so that this work may be done to the best advantage. Other conditions being equal, one should locate near the home buildings and water supply. For the home orchard it will not be difficult to group the trees about the buildings in such a manner as to make them easily accessible for spraying, the most important, yet the most neglected, part of the orchard's care at present. But for the commercial orchard the question of location assumes various other phases, such as the cost of land; access to shipping points; facility of tillage, depending upon character of soil and climate; the inter-adaptability of climate and varieties, and the prevailing climatic conditions of the locality.

Select for a site as low priced land as is compatible with the desired requirements; deep, well-drained, moderately heavy, friable, fertile soil, in a locality where climatic conditions and transportation facilities are favorable to the development of the crop.

SITE, AS TO SOIL.

Upon this very important phase of orchard-making, all authorities are practically agreed. From the old orchards, and especially the old trees of both Europe and America, the west and the east, the same lessons are learned. With one accord these trees, though separated by leagues of land and water, proclaim the creed of the apple tree—complete air and water drainage, and a deep, loamy soil.

Speaking upon this topic about 200 years ago, Miller, an English authority, said:

A gentle hazel loam, which is easy to work and does not retain the wet, is the best. Although these trees will grow on very strong land they are seldom so thriving, nor is the fruit so well flavored as upon trees grown on a gentle soil. Dry, sandy, or gravelly soils are wholly unfit for the apple tree.

Delaville,* writing upon the subject of soils suitable to fruit culture in France, says:

A good soil for all fruit trees is composed of equal parts of sand, clay, and lime.

Baltet,** a popular French horticultual writer, in discussing the subject of soils desirable for the apple, remarks that:

A wheat soil is the soil for the apple tree when grown as a standard.

The importance of thorough drainage in connection with a good soil is emphasized by the same author in these words:

The fruit of the apple is largest in the humid valleys, but best flavored on the hills and dry table lands. The excess of humidity, as the need of free air, inducing canker and favoring the aphis.

Nanot,*** in his treatise upon the cider apple, thus speaks of the soil as bearing upon this fruit:

The apple is not very particular as to the nature of the soil; it neither dislikes very clayey, very limey, nor very sandy soils, but the best flavored and longest keeping fruits come from trees grown on clay loam.

Dr. L. H. Bailey,**** speaking of apple-growing in the eastern United States, says:

As a rule, rather light or loamy soils, with deep and porous sub-soils, are best adapted to apple growing. Natural drainage is imperative. Apple trees are impatient of wet feet.

At a meeting of the Oregon State Horticultural Society, held in Newberg in 1901, E. L. Smith made the following statements while speaking briefly of the apple:

Apples grown on sandy soil will weigh much less per bushel than those grown on clay or clayish soils, other conditions being equal. Apples to be long keepers must be grown on soil having some clay.

In reply to a question relative to this point, Col. G. B. Brackett, the pomologist of the U. S. D. A., writes (1904): "I know of no experiments along this line, but I am inclined to think that apples grown upon clay loam, other conditions being equal, would be somewhat heavier than those grown upon light, sandy soil. I know that apples that are grown on heavy clay soil are apt to keep better than those grown upon light, sandy,

*Cours Practique D'Arboriculture Fruitiere, 1897.
**Traite de la Culture Fruitiere, 1900.
***Le Culture du Pomme a Cidre, 1895.
****Field Notes on Apple Culture, 1893.

porous soil. Of course, keeping qualities depend somewhat upon latitude, and also upon the elevation at which they are grown."

From somewhat extended general observations in the apple orchards of Western Oregon during the past decade or more, I am convinced that much of our soil is admirably suited to the apple tree. The land upon which the Douglas fir thrives, when not too steep and rocky, is usually well adapted to the culture of this fruit. The alluvial soils of the minor valleys when of a depth of eight to twelve feet or more produce thrifty, vigorous, long-lived trees. Some of the best old orchards in the State are located upon the gentle rolling lower hill lands of Yamhill County, while some of the cleanest and thriftiest of the younger generation orchards are to be found on the red hill lands of Polk and Marion Counties. In the selection of a site on the higher elevations, or even upon the lower hill lands, care must be exercised to the end that shallow soils may be avoided. Streaks, patches, or larger areas of these lands are occasionally underlaid at a depth of a few feet by strata of impervious rock. Such sites are wholly unfit for orchards. Only a close and thoughtful inspection of hill land tracts will enable one to avoid setting trees on soil too shallow for the successful growth of long-lived and fruitful trees.

Many excellent small orchards are to be found upon the river bottom lands in all parts of the Willamette Valley. While these latter sites are well suited to the growth of the apple tree, it is probable that better returns, horticulturally, may be obtained by the cultivation upon such sites of the smaller fruits and the choicer vegetables, especially when nearby markets are reasonably good. The latter crops cannot be grown upon the higher lands with the same degree of success as attend their culture upon the river bottoms, while with the apple there is no apparent difference save, perhaps, in the degree of earliness with which the trees begin to bear profitable crops.

Generally speaking, orchards upon bottom lands will begin to bear from one to three years later than those upon the higher lands. There are well known instances in which trees planted upon river bottom land, as a result of an abundance of water, have extended their vegetative period three to four years beyond the normal period for the same varieties when grown upon correspondingly good upland sites. The economics of horticulture would appear to point toward the uplands as affording the more promising sites for the apple orchard, since the value of such lands will not increase as fast as that of the more restricted tracts of suitable river bottom soils.

Drainage.—Having settled the matter of soil, the next important point is the drainage of the site. If possible, by all means select a site that is naturally well drained. It should be so drained that both an excess of water and cold air can readily escape to a lower level. While the apple very much dislikes a wet, soggy soil, it equally dislikes a site upon which cold air may stagnate. Cold air seeks the lowest levels. It frequently carries with it the frost waves that kill blossoms in the spring, or immature wood in the autumn. The force of this point is readily impressed upon the minds of all those who drive over the gently undulating sections of our valley after nightfall in the spring or early autumn months. Every hollow, especially if it be one without pronounced outlet to lower levels, fills up with cold air, and as one passes from the crest to the bottom and up the opposite side, the change from the cold air of the bottom to the warmer strata above is as distinctly marked as the passing from a warm room to the open air on a frosty morning. Such places, hollows, or pockets, into which cold air may settle and remain with little or no motion, are death traps, not alone for the apple, but for fruit trees in general. Though the soils in such places may be good and deep and water drainage of the best, yet is the site deficient in one of the most

Young Apple Orchard, Waldo Hills, Marion County.

important elemental features of a site—air drainage. It is as imperative to keep still cold air away from the tree's head as it is to keep stagnant water away from its feet.

The diversity of geological formation and exposure in the apple-growing districts of Oregon render this topic of aspect a peculiarly interesting one. In some sections little attention aside from that given to heavy winds is necessary; in other sections the southern exposures, while desirable in many respects, are liable to have a thin soil underlaid by impervious rock; in still other sections the northern slopes, ideal in several features, have a soil, rich, deep, full of humus, very moist, and thus prone to keep the tree growing too late in the season, and unduly retard the bursting of the buds in the spring; and in yet other sections the aspect is quite a matter of indifference, as in the Rogue and Grande Ronde River valleys proper. But upon the bench lands of these sections, when more attention is given to the planting of orchards upon them, due attention to aspect will be of no little importance, and may be a deciding factor between success and failure with particular varieties. Especially in Rogue River Valley would it appear that the later keeping varieties will demand the cooler northern exposures, while the earlier varieties will do best upon the southern and eastern slopes.

In the Willamette Valley, except in the districts tributary to the "gaps" in the Coast mountains, through which strong sea breezes issue, a southern aspect would seem generally desirable, providing it is not a hillside with thin soil. The general low altitude of the valley, together with the average high humidity, makes an open or southern aspect desirable, since under such conditions fruit will tend to take on a higher color, an item of considerable importance in the commercial part of the crop. For early or mid-season varieties, however, and particularly those for home use, where one attaches more importance to fine specimens with clear skins, mellow flesh, and juiciness, and where several days or a week's time in the date of ripening does not detract from the value of the product, a northern, western or sheltered aspect may be of first choice.

While high color is usually a feature of much commercial value in the apple, those who have formed a discriminating taste and grow fruit for their own use, give it but passing notice. Thus it is that the aspect most desirable for the commercial orchard may be of but secondary importance to the home orchardist.

As much of the autumn weather in Western Oregon is of low, light value, owing to the humidity, it is necessary to use considerable discretion when selecting a site for the growing of a commercial apple crop of the late keeping varieties, if one would have a high colored product one year with another. Judicious wood pruning and thinning of fruit will materially aid in enabling the fruit to get the most advantage from the light available.

SELECTION OF TREES AND PLANTING.

The proper selection and planting of trees is an important part in the starting of an orchard.

Tree Ideals Faulty.—At the outset it may be said that our general ideas of the character of a first-class tree are quite faulty. Each variety of fruit tree is more or less characteristic in its form of growth—"habit," as it is often termed—and it is fortunate that this is so, else what a monotonous appearance our orchard plantations would assume. To this fact, that each variety possesses a characteristic habit, we should give more than passing attention when selecting trees for a new orchard. For, in order to obtain first-class trees for planting, and none other should be used, the orchardist must have a knowledge of the "points" of a good tree of the variety under consideration. Some trees while in the nursery

assume an erect, strict habit, with an even, regular taper; others are kinky, irregular in the direction of ascent, and having an uneven taper; and still others are short, thick and inclined to branch. Yet, notwithstanding this wide divergence of character, these trees may be all first-class. The character or habit of the variety must be fully studied, and then trees possessing a strong inclination to follow the type habit should be selected. Oftentimes no better source of information on these points can be found than the nurseryman. It is his business to study trees. If the market sets, as it often does, in its misguided demand, a general uniform requirement for all trees, then the nurseryman is obliged to meet it, and the attempt is made to grow all varieties to a common type, or else discard those varieties that do not form a "pretty tree" of gross vigor regardless of important merit. When the planters learn that the trees of no two varieties have the same habit—in fact, that no two trees are alike—then may we expect to find nurserymen growing trees for their real merits, and not for looks. It may be a real merit for a tree to be straight, or it may be a merit for it to be kinky, thick, and with little taper. It all depends upon the variety. If you have not well-defined ideas of the requirements of first-class trees, then take counsel of a reliable local nurseryman of some years standing, if such an one is to be found in your locality. If not, then deal with the established firm that is nearest you, and one that would be connected naturally with your locality commercially. Under such circumstances it is generally safe to rely upon the dealer to send you first-class trees of the varieties ordered, for his business reputation rests upon the service he performs. In this age, when the market value of an object depends so largely upon looks, and when our ideas or tastes in this direction are the result of faulty education, it is little wonder that our ideas of what looks good may be quite out of harmony with the real merits of the object under consideration.

Age of Trees to Plant.—Formerly, and even at present in some parts of the east, writers advise the prospective orchardist to purchase two-year-old, or even three-year-old trees for transplanting. But such advice is rarely, if ever, given in Oregon at the present time. Trees one year old are old enough. The younger a tree is when removed from the nursery the less of its active root system is left there. The least check is given to a plant when it can be transferred with root and stem systems intact. It is quite impracticable to remove a grafted or budded tree from the nursery without more or less injury to its root system. The younger the tree is, however, the less will be this injury, and consequently the less the check in its development as a result of removal. As the tree gets older, larger wounds are made upon the roots as they are severed, and these wounds offer a place for attack by fungi, and often prove the source of much trouble to the future tree. When the young tree is removed from the nursery row, relatively small roots are severed; the wounds, if properly treated, soon heal, and danger from fungous foes is reduced thereby to a minimum.

One-year-old apple trees often grow to be five feet, and more, tall, and five-eighths of an inch, and more, thick on Oregon nursery land. It is rarely, if ever, that we find yearling apple trees less than three feet in height. There is no reason for asking for larger trees for transplanting.

How to Plant.—The trees selected, next comes the planting. If possible the roots should be carefully pruned immediately upon removal from the nursery row. This can only be done when the nursery is near by, and the buyer can be on the ground at the time removal is being made. Trees should remain out of the soil only so long as is necessary to transfer them to the packing or healing-in grounds. If one can get the trees at the nursery when lifting operations are in progress, he can remove all bruised and broken roots; make clean and smooth all end where roots have

been cut or broken off by the lifting implements; cover the trees with moist cloths, straw, or hay, and convey to the site for planting with as little delay as may be, at all times using great care not to expose the roots to drying winds or frosts while out of the ground. Upon getting the trees at place of planting, or the home, heel them in at once. If the trees have been transported by rail or boat, see that all broken roots are removed, and that fresh, clean, smooth cuts replace broken, bruised or roughly made end wounds before they are heeled in.

Heeling-in.—Dig a trench on the north side of a building, in the shade of a grove, or on the north slope of a hill. Make the north side quite steep; give the other side an easy slope; place the trees upon the sloping side, one, two or three deep, with their neatly-trimmed roots close up to the steep side or face of the trench, then cover them over with fine soil to the depth of a few, or several inches, depending upon whether or not they are to endure freezing weather while heeled-in. This treatment first of all keeps the air from the roots, keeps them moist, and enables the wounds to "callus," a process necessary to the perfect healing of the wounds and the early and vigorous production of new rootlets. When once the trees are rooted, pruned and heeled-in, they are in the best condition for awaiting the time for the next step—planting.

DISTANCE APART TO PLANT.

Most of the local nurserymen advise planting the apple from thirty to forty feet apart. Some of the larger growers, like the Olwell Brothers, take the position that the trees in an apple orchard should be planted at least thirty-six feet apart each way on the heavier soils. For the first few years this seems like a useless waste of land. But if the soil is such as an apple orchard ought to be put upon, it will not be long before it will be apparent that to successfully operate the implements of tillage, spraying, and harvesting, the trees at thirty-six feet apart are close enough. Yet, notwithstanding this position of many of the larger orchardists as well as the eastern authorities, some of our most successful orchardists take exception to these distances.

Early apples and the varieties of rather dwarf stature do not need as much room as those of more vigorous habit, or later maturity. Then, again, trees grown on a deep, heavy, moist soil, where the season of growth is long, need much more room than when grown upon light, shallow, dry soil, if it is permissible to put the apple upon such soils as the the latter. Discussing the soils of the river bottom lands of the Willamette Valley and the foothill lands of portions of Southern and Eastern Oregon, where some most excellent apples are grown, the position is still one that holds good in all sections equally well, for not all apples of Western Oregon are grown on bottom lands, nor are all apples grown in Southern Oregon and Eastern Oregon grown on bench lands.

Other conditions being equal, dwarf-growing trees, shortage in water supply, lightness of soil, and closeness of trees tend to induce early fruitfulness and maturity. But in the presence of ample water and deep, fertile soil, trees may grow so vigorously as to cause branches to interlap, thus rendering the tops a matted, bushy mass of fruitless wood, much of which must be removed before the trees begin to bear, and in many instances some of the trees themselves must be taken out before space sufficient for ripening a good crop of well-colored fruit can be had. Such conditions cause much loss in both time and labor, and the trees thus grown yield an inferior product, all of which may be avoided by planting the trees at such a distance as will allow ample space for full growth and the formation of an open head with free access to light and air.

For standards this would be not less than thirty-six feet on good soil, and forty feet would probably be better. On lighter or shallower soils the distance apart might be reduced to thirty or thirty-two feet.

Double Planting.—In order to bring all of the soil of the orchard into early service, some of our best orchardists, especially in Eastern Oregon, recommend the planting of two or more types of trees at the time of setting out the orchard. For example: If the orchard is to be composed of standard varieties, set at forty feet apart, half way between the trees each way should be set trees of some early-bearing varieties. As the standard trees begin to bear, these "fillers," as they are commonly termed, may be removed. The advantages claimed for this mode of planting is that the standards are protected by the fillers, which come to maturity earlier and a crop is produced from the soil, thus helping to pay the expenses of tillage for the period during which the standards are growing wood. Others of our leading orchardists contend that better results follow the growing of herbaceous crops, as potatoes, beets, tomatoes, and even corn. The tendency of most people to leave trees, when planted as fillers, until they encroach upon the space and food supply of the regular plantation, leads one to accept the latter view as being the better for the average planter to follow. There is a greater probability that annual crops be discontinued before their culture would in any way detract from the care and food supply required by the permanent plantation.

Plan of Planting.—There are two general styles of orchard plantings, the hexagonal and the square. Fig. 12 represents a plat planted on the hexagonal plan. The rows are twenty-eight and one-half feet apart three ways, while the trees are thirty-three feet apart. Fig. 13 represents a plat planted on the square plan. The rows are thirty-two feet apart at right angles. Even at the closer distance in this latter plan there are less trees to the acre. With rows farther apart, there would be about the same relative difference between the numbers of trees per acre on the separate plans.

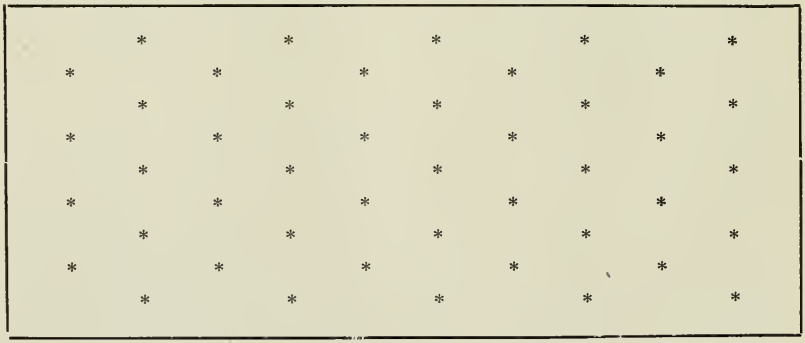


Fig. 12. 45 trees, 33 feet apart.

Fig. 13. 48 trees, 32 feet apart.

In the former style each tree is equally distant from the six adjacent trees surrounding it; or, in other words, all adjacent trees are equally distant, while in the latter style each tree is equally distant from only four adjacent trees. Thus it will be seen that by adopting the hexagonal plan the land space is more economically used; the trees are more evenly distributed over the land.

To lay out a piece of land on the square plan it is necessary to establish two base lines at right angles, which may be done by sighting along the long and short arms of an ordinary carpenter's square, set upon three stakes driven at the corner of the proposed plantation, and setting two rows of stakes in lines continued from the arms. Put the stakes as far apart as the rows are to be, and when the stakes have been set, in lines at right angle to each other, to the limit of the piece of land to be planted, move the square to the corner diagonally opposite the first used and run lines of stakes along the other two sides of the piece. Then by using a few long stakes, two men can "line-in" the stakes for the body of the plantation. The outside rows of trees ought to be at least one rod inside of the fence line.

If the plan adopted is the hexagonal, then a somewhat more different course is to be followed in the first part. Establish one base line for the first row of trees. Let this row be from one rod to 20 feet from the fence line. Firmly drive small, one-inch square stakes where each tree of this row is to be set. Procure a wire, No. 10 or 12 is about right weight, make a fixed loop in both ends so that the distance between the extreme ends of the loops is one inch more than the distance at which the trees are to be planted. Then let A put one loop over stake one; let B put a stake through the other loop, step off toward the center of the field; when the wire is taut, he shall describe a short arc in the earth with the point of the stake. Let A then step to stake two, row one, over which he places the loop in his end of the wire; when the wire is again drawn taut, another short arc is made. Where the two arcs intercept a stake should be driven for the first tree in row two. While A remains at stake two, row one, B passes to a point at which he estimates the next stake for row two should be placed, another short arc is described, and A passes to stake three, row one. A second intercepting arc is made, and B places stake two of row two, and so on till the row is complete. From this point other stakes may be sighted in, as the two base rows will afford a good foundation. If the site is rolling, the stakes of these first two rows ought to be four to six feet long.

After the plat is well staked it is ready for planting, and herein probably lies the most difficult part for the beginner, as he too often finds it impracticable to get the trees planted in as good lines as the stakes were. A little device for keeping the tree exactly in the place occupied by the stake is illustrated in Fig. 14. When about to plant

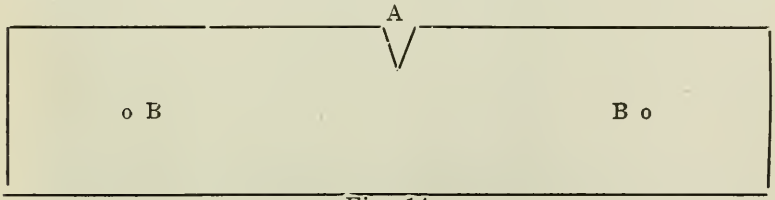


Fig. 14.

a tree, place the notch A over the stake which has been set in place for a tree; then drive a stake through each of the holes B B; in this

Sherman Apple Orchard, Ashland.

way the guide is fastened in such position that the notch is over the spot in which a tree is to be set. Now remove the guide, leaving the three stakes in position. Pull out the center stake, dig the hole for the tree, place the guide in position, with holes B B over the two outside stakes; put the tree in position, so that it occupies the notch A. Cover the roots with earth, firmly pressing it with the feet. When the hole is filled and the tree sets firmly, remove the guide, pull up the two end stakes and repeat with next tree. If the work is carefully done, the trees should line up as well as the stakes did. Trees having irregular trunks must be so set that the general line of growth will be in position. If there is a likelihood of strong wind prevailing from a definite quarter during the first few years' growth of the trees, they should be so planted as to lean firmly in the direction of the wind.

The trees should be so set that when the soil about them fully settles they will still be in the ground as deep, or, better, two or three inches deeper than before removal from the nursery.

The hole into which the young tree is transplanted should be made large enough so that all roots may assume a fully extending and spreading position. No roots should be placed in a curled or twisted position. The center of the hole should be higher than the margin. This will allow the roots to assume a natural position, slightly downward and outward. The earth that is placed immediately in contact with the roots should be finely pulverized and pressed down firmly. For this purpose the feet may be effectively used, care being exercised that no injury is done the roots b ytramping directly upon them. When the hole is about half filled no further pressure is needed, and the soil may be thrown in loosely, finishing by heaping it up about the trunk five or six inches above the general surface.

In sections where more or less frost accompanies the winter season, fall-planted trees may be rendered good service by the addition of a coarse mulch to the surface of the soil, but under no conditions allow the mulch to surround the trees closely, otherwise rodents may infest it and "bark" the tree. If it is spread upon the ground, and then a small mound of earth, as before stated, surrounds the tree, thus preventing the mulch material from coming in contact with it, damage from the small gnawing animals may be fully prevented.

POLLINATION.

During recent years no one phase of orcharding has received more thought than that of pollination. Though more or less regarded by the leading horticulturists of the past, at least since Knight's time, this subject rose to one of paramount importance upon the publication of a bulletin upon the pollination of the pear by M. B. Waite in 1893. Since the appearance of this bulletin many observations have been made upon this very important subject, and all have tended to prove the importance of it. Today no intelligent orchardist contemplates planting varieties until he has fully investigated their self-sterility or self-fertility and their fitness for cross-fertilization. However, it must not be understood that all failures of crop can be ascribed to the impotency of pollen. Nor that the pollen of relatively shy bearers like the Spitzenberg or Northern Spy is altogether impotent, for it is known that in many instances the pollen of such varieties is efficient as a fertilizer.

Then, again, local climatic, soil, seasonal, or other conditions may be such that the pollen of some individuals or varieties may be impotent one season, while fully effective the following or subsequent years. This fact is particularly evidenced in the conduct, one season with another, of the Italian prune. Large blocks of this fruit are to be

found in various parts of Western Oregon and Western Washington, in particular. Some years it bears a fairly full crop in all sections; in other years the orchards in one or more localities will fail, or produce but a partial crop, while orchards in other parts bear full crops; and even individual orchards in a locality may bear a full crop, or none, while others are returning opposite results. From the researches of Waite and others, there is reason to believe that the same general rules relating to the impotency of pollen will apply equally to the apple, pear, plum, and cherry, though perhaps less noticeable with this latter fruit, as large blocks of single varieties are not as common as with the others.

In summarizing the results of this work upon the apple and the pear, Waite says: "Too much importance must not be attached to cross-pollination as a factor in fruitfulness. There are other factors equally as important. The variety, vigor, health, age, heredity, and vitality of the tree; the presence of undue climatic, soil, and site conditions, and fungous diseases are all vital factors in the fruitfulness of orchards, and must not be overlooked."*

Varieties generally considered self-fertile—that is, safe to plant alone, are: Ben Davis, Rome Beauty, Jonathan, Baldwin,** Fallawater, Oldenburg, Rhode Island Greening, Astrachan.

Varieties that are considered more or less self-sterile are: Spitzenburg, Northern Spy, Gravenstein, Winesap, Belleflower, Willow Twig.

The above list is only tentative at best. Investigators are a unit in declaring that, other conditions being favorable, nearly all varieties are more or less improved by cross-fertilization, hence a liberal mixing of varieties in a plantation is to be recommended, provided they are capable of inter-pollination, for it must not be forgotten that not only are varieties self-sterile, but that they are also cross-sterile. Until much more information is obtained in detail as to the conduct of particular varieties under the varied conditions to which they are subject, implicit confidence cannot be placed upon the reputed behavior of other than a few of the varieties most widely grown, as Ben Davis, Winesap, Jonathan, Rome Beauty.

In view of this condition, a point of much interest to the apple grower is the relative periods of blossoming of the inter-pollination varieties, for with a knowledge of this at hand there may be planted side by side such varieties as will inter-pollinate and blossom during the same period, thus effecting cross-fertilization, and thereby doing away with the troublesome question of sterility, and at the same time deriving the best possible results as to size and quality of the crop at a possible minimum of loss. If the plantation is of such size that three or four varieties may be grown to advantage, so far as marketing the crop is concerned, then the problem becomes one of getting such first-class varieties as will succeed on the proposed site, inter-pollinate and blossom at the same period. If it is not possible to get first-class inter-pollinating varieties that will blossom at the same time, it may be possible to get an inferior variety at slight disadvantage, as to marketable value, that will pollinate the better varieties. Under such conditions the insuring of a crop of the best grade fruit of two or three choice varieties at an expense of one inferior variety would be considered a judicious procedure.

For several years a record of the college orchard has been kept with this point in view: namely, to ascertain what varieties blossom at the same period. The following tables give the results in substance.

*Waite, M. B., U. S. Agricultural Report, 1898.

**Trees of this variety have been observed to be apparently self-sterile. See report quoted above.

One observation, however, needs to be made at this point. Records kept at other places, both within and without the State, show that the periods of blossoming of certain varieties do not remain invariable. In other words, two or more varieties that blossom at approximately the same period at Corvallis may not blossom together at Hood River and La Grande, or at Medford and Cove.

For example: It will be observed that during the season of 1903 at Hood River—

Early Harvest and Red Astrachan were in full blossom on May 1st.

Jonathan, Spitzenburg, Ben Davis, and Baldwin were in full blossom on May 8th.

Yellow Newtown, May 10th; Northern Spy, May 12th.

It is noted at Cove—

Early Harvest and Red Astrachan were in full bloom on May 5th and 20th, respectively.

Jonathan, Spitzenburg, Ben Davis, and Baldwin were in full blossom on May 20th, 25th, 20th, 16th, respectively.

Yellow Newtown, May 25th, and Northern Spy, May 20th.

The same season the records at Corvallis show that the Early Harvest tree under observation did not blossom; that Red Astrachan was in full blossom April 28th; Jonathan, May 1st; (Spitzenberg, no tree old enough to blossom in the college orchard); Ben Davis, May 4th; Baldwin, May 5th; (Yellow Newtown Pippin, no tree in the college orchard); Northern Spy, May 12th.

On closer comparison it is found at Hood River that, while there is uniformly seven days' difference between full blossom of Early Harvest and Red Astrachan on one side, and Jonathan, Spitzenburg, Ben Davis and Baldwin on the other; at Cove there were two days' difference between the first two, and as between these and the other four the time varied from nine to twenty days, and at the same time the variations between the members of this second group were from four to nine days.

At Hood River the Yellow Newtown preceded the Northern Spy by two days. At Cove this order was reversed with a difference of five days.*

While it is reasonable to think that no very great value can be attached to the observations of one or two years, it is evident from the records kept at Corvallis, though they are very incomplete, that a very variable relation exists from year to year not only between different varieties, but between the various phases of development in the same variety, for example: In 1896, Delaware Red and Dominie were in full blossom 17 days apart, but in 1897 there were in full blossom only two days apart. Then in the record of Fameuse we find a variation between the opening of first blossoms and full blossom to vary from seven days in 1896, to three days in 1897, to twelve days in 1898, to nine days in 1900, to fourteen days in 1901, and to eight days in 1903. Or in other words the period from the opening of first blossoms to the time when the tree is in full blossom may vary from year to year, from three to fourteen days, which is equivalent to the variations between different varieties doing the same work.

An interesting note is made by comparing the average of time that elapses between first blossoms and full blossoms in different sections. From the table of Cove data it will be observed that the minimum time

*It is quite probable that some slight variation in these dates may be accounted for through the difference of individuality of the observers, but it is improbable that it can all be accounted for in this manner when we take into account the personality of the observers in these two instances.

is 15 days, the maximum is 20 days, the average fifteen and three-fourths, approximately. For the same year at Corvallis the minimum was four days, the maximum was eleven days, and the average less than seven days. These latter figures are upon data derived from the blossoming of all varieties and may be counted as of little value for purposes of comparison except as a matter of record at this time.

Observations upon the blossoming of apple trees in the Rogue River Valley, 1903, by Olwell Bros.

Variety	First blossom	Full blossom
Gravenstein	4.12	4.25
Yellow Newtown	4.20	5.4
Ben Davis	4.20	4.28
Winesap	4.24	4.30
Spitzenburg	4.24	5.2

Observations upon the blossoming of apple trees in the Hood River Valley for 1902 and 1903, by E. L. Smith.

Variety	First blossom, 1902	Full blossom, 1903
Baldwin	May 8	May 8
Ben Davis	8	8
Canada Reinette	6	6
Delaware Red	6	6
Early Harvest	8	8
Esopus Spitzenburg	1	1
Gravenstein	1	1
Grimes Golden	4	4
Jonathan	8	8
Missouri Pippin	8	8
Red Astrachan	4	1
Red Russian	1	1
Salome	8	8
Stark	8	8
Swaar	8	8
Transcendent (crab)	4	4
Wagner	6	—
Winesap	4	4
Yellow Transparent	4	4
Yellow Newtown	10	10
Northern Spy		12

Observations upon the blossoming of apple trees in Grand Ronde Valley, 1903, by Karl J. Stackland.

Variety	First blossom	Full blossom
Arkansas	May 1	May 21
Baldwin	1	16
Ben Davis	5	20
Early Harvest	April 20	5
Esopus Spitzenburg	May 10	25
Gano	5	20
Jonathan	5	20
King	1	16
Northern Spy	5	20
Oldenburg	10	25
Oregon	April 20	9
Red Astrachan	May 5	20
Rhode Island Greening	5	20
Rome Beauty	April 20	7
Winesap	May 15	30
Yellow Newtown	10	25
York Imperial	15	30

Variety	1896			1897			1898			1900			1901			1902			1903		
	*A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Autumn Sweet							4.21	5.3	0	4.15	4.21	5.1	4.28	5.8	5.16						
American							4.28	5.4	0				4.27	5.7	5.14						
Abram							4.21	4.30	0	4.9	4.20	5.8							4.28	5.5	0
Arkansas													4.25	5.7	5.11				4.26	5.1	0
Baldwin	4.17	4.30	0																4.27	5.2	0
Bailey Sweet				4.29	5.3	0	4.19	5.2	0	4.16	5.1	5.10	4.29	5.9	5.17				5.3	5.10	0
Bethlemite				4.30	5.3	0	4.22	5.5	0				4.17 4.28	5.2 5.4	5.10 5.16				4.28	5.5	0
Bietigheimer				4.23	4.26	0	4.18	4.30	0				4.20	4.29	5.9				4.25	5.3	0
Briar (crab)							4.22	5.4	0										4.28	5.4	0
Ben Davis				4.28	5.1	0	4.25	5.9	0							5.5	5.10	5.19	4.28	5.4	0
Bottle Greening							4.22	5.4	0	4.13	4.21	5.1	4.20	5.3	5.12	4.25	5.7	5.19			
Blenheim Orange													4.22	5.5	5.12	5.1	5.7	0	4.24	4.30	0
Belleflower, Y.							4.22	4.30	0				4.19	5.4	5.9	4.28	5.8	0	4.28	5.3	0
Black Twig							4.25	5.6	0				4.18	5.5	5.11	4.29	5.8	5.19	4.27	5.2	0
Bismarck																			4.28	5.3	0
Canada Sweet							4.19	5.5	0	4.7	4.18	4.25	4.22	4.29	5.3				4.28	5.4	0
Canada Reinette										4.15	4.23	5.3	4.28	5.2	5.19						
Charlottenthaler							4.17	5.3	0	4.16	5.2	5.18							4.29	5.4	0
Calvert										4.15	4.28	5.8							4.27	5.4	0
Canada Red							4.25	5.4	0										5.2	5.10	0
Commerce																			4.29	5.4	0
Dutch Mignonne							4.25	5.1	0	4.7	4.18	4.30	4.20	4.28	5.8				4.25	5.6	0
Deleware Red	4.28	5.11	0	4.17	4.28	0	4.22	5.6	0	4.12	4.18	5.1	4.22	5.3	5.11						
Dominie	4.16	4.24	0	4.15	4.26	0	4.12	4.22	0	4.3	4.15	4.28	4.16	4.28	5.7				4.22	4.29	0
Earley Harvest													0.	4.18	4.28						
Ewalt				5.3	5.11	0	4.25	5.4	0	1.12	4.20	4.28	4.17	4.28	5.10						
Earley Strawberry				4.19	4.23	0	4.16	4.28	0	4.6	4.15	4.28	4.16	4.29	5.7						
Fall Pippin	4.17	5.7	0																		
Fall Wine							4.19	4.28	0							4.23	4.25	5.6	4.24	5.2	0
Fallwater				4.25	5.6	0	4.22	5.1	0	4.7	4.15	4.29	4.16	4.26	5.11				4.28	5.4	0
Fall Jennetting				4.22	4.23	0	4.18	5.1	0	4.7	4.15	4.25	4.18	4.27	5.10						
Fameuse	4.22	4.29	0	4.20	5.1	0	4.16	5.4	0	4.10	4.20	5.10	4.20	5.2	5.6						
Gano										4.16	4.21	5.8	4.22	5.10	5.17				4.29	5.4	0
Grimes Golden							4.19	5.1	0	4.9 4.15	4.20	4.30	4.19	5.2	5.8				4.28	5.5	0
Green Sweet				4.27	4.29	0	4.25	5.1	0	4.15	4.18	4.30	4.20	4.29	5.11						
Golden Sweet	4.14	4.27	0	4.19	4.29	0	4.18	4.28	0	4.9	4.18	5.1	4.20	4.29	5.8				4.27	5.5	0
Gravenstein							4.22 5.13	4.30 4.26	0 0	4.10	4.16	4.28	4.17	4.25	5.2						
Hoover				4.29	5.3	0	4.29	5.9	0				4.30	5.6	5.14	5.6	5.14	5.20	4.27	5.3	0
Hydes Keeper							4.20	5.2	0	4.7	4.18	4.28	4.22	5.3	5.8				4.25	4.30	0
Holland Beauty										4.11	4.22	4.30	4.28	5.10	5.20						
Holland Pippin	4.17	5.2	0	4.20	4.26	0	4.25	5.5	0	4.15	4.25	5.1	4.23	5.9	5.18				4.29	5.5	0
Hyslop (crab)	4.13	4.20	0	4.20	4.26	0	4.18	4.24	0	4.9	4.19	4.28	4.21	4.29	5.8				4.27	5.3	0

Variety	1896			1897			1898			1900			1901			1902			1903		
†	*A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Haas							4.17	4.27	0	4.6	4.16	4.25	4.16	4.26	5.6				4.23	4.30	0
Jonathan							4.24	5.5	0				4.21	5.6	5.13				4.27	5.1	0
Janetting	4.24	5.7	0	4.20	5.3	0	4.15	4.23	0										4.27	5.4	0
Jewetts Red							4.25	5.2	0	4.15	4.23	5.3							5.2	5.9	0
Kentucky Red Streak							4.24	4.29	0										4.28	5.4	0
King				4.28	5.8	0	4.22	5.2	0	4.13	4.20	5.2	4.19	5.5	5.10	5.1	5.9	0	4.28	5.5	0
Keswick Codlin										4.9	4.18	4.25	4.17	4.28	5.8				4.28	5.4	0
Longfellow	4.4	4.15	0				4.13	5.1	0	4.8	4.15	5.1	4.16	4.28	5.8				4.28	5.3	0
Limbertwig							4.24	5.8	0							4.28	5.7	5.16	4.27	5.3	0
Mann							4.23 4.16	5.3 4.25	0 0	4.7	4.15	4.24	4.16	4.29	5.8				4.28	5.5	0
Melon							4.25	5.8	0	4.16	4.28	5.3	5.2	5.8	5.15						
Munson	4.19	5.3	0				4.22	5.7	0	4.10	4.20	5.1	4.22	5.2	5.9						
McMahon							4.22	5.6	0										4.28	5.3	0
Maiden Blush (Winter)	4.20	5.7	0	4.29	5.3	0	4.22	5.6	0	4.9	4.16	5.1	4.21	5.	5.10	5.4	5.8	5.18	4.28	5.4	0
Martha	4.13	4.23	0	4.19	4.29	0	4.16	4.25	0	4.7	4.16	4.30	4.17	4.27	5.8				4.28	5.5	0
Montreal (crab)	4.9	4.20	0	4.18	5.1	0	4.16	5.1	0	4.6	4.16	4.26	4.17	5.2	5.10				4.23	4.30	0
Minnesota (crab)							4.18	5.2	0							4.20 4.25	5.8 5.4	5.17 5.15	4.26	5.2	0
Missouri Pippin	4.24	5.13	0	4.20	4.29	0	4.23	5.2	0	4.13	4.21	4.26	4.17 4.28	5.4 5.9	5.12 5.18						
May										4.17	4.28	5.8	5.1	5.10	5.20				5.3	5.7	0
Oregon Crab				4.15	4.17	0	4.12	4.22	0	4.4	4.13	4.18	4.16	4.25	5.2				4.21	4.28	0
Ortley							4.18	4.30	0	4.9	4.19	4.28	4.22	5.2	5.8				4.29	5.4	0
Oldenburg				4.14	4.20	0	4.13	4.25	0	4.11	4.12	4.20	4.18	4.25	5.7				4.24	5.2	0
Pryor (Red)							4.29	5.5	0	4.15	4.23	5.2	4.23	5.5	5.13	5.5	5.10	5.17	4.27	5.2	0
Pewaukee	4.25	5.10	0				4.23	5.8	0							4.28 5.3	5.6 5.8	5.19 5.19	4.29	5.5	0
Paradise Sweet				4.23	4.26	0	4.24	5.3	0	4.6	4.20	4.28	4.22	5.2	5.7				5.1	5.6	0
Pumpkin Russett				4.20	4.29	0	4.24	5.3	0	4.12	4.18	5.2	4.20	5.7	5.16				4.28	5.4	0
Palmer																			4.26	5.3	0
Rome Beauty				5.8	5.10	0	4.27	5.8	0	4.23	5.1	5.3	5.7	5.14	5.20				5.6	5.10	0
Red Astrachan	4.16	4.20	0	4.23	4.26	0				4.7	4.12	4.20	4.19	4.22	5.1				5.21	4.28	0
Roxbury							4.23	5.5	0	4.19	0	5.4	4.28	5.6	5.18						
Rock Pippin	4.27	5.6	0				4.22	5.2	0	4.15	4.20	4.28	4.22	4.26	5.7				4.28	5.5	0
Romanite	4.19	5.6	0	4.21	4.30	0	4.19	5.9	0	4.9	4.27	4.29	5.1	5.9	5.16						
Ralls										4.7	4.16	4.25	4.21	4.26	5.1						
Red Canada										4.15	4.28	5.4	0	4.16	5.4	5.5	5.10	5.19			
Rambo	4.22	5.7	0				4.26	5.4	0	4.15	4.28	5.6	4.20	5.3	5.11				5.1	5.9	0
Red Winter													4.23	5.6	5.13						
Rhode Island Greening							4.22	5.4	0	4.13	4.20	5.5	4.22	5.2	5.9						
Siberian Crab	4.5	4.15	0	4.20	4.23	0	4.17	4.30	0												
September (crab)							4.22	5.2	0										4.26	4.30	0
St. Lawrence							4.18	4.29	0	4.9	4.16	5.1	4.17	4.26	5.6						

Steeles Red							4.22	5.2	0				4.21	4.29	5.6	5.1	5.9	5.17	4.29	5.2	0
Sweet Bough	4.25	5.7	0	4.21	4.29	0	4.22	5.2	0	4.9	4.20	5.2	4.20	5.3	5.10				4.27	5.4	0
Shiawassee				4.22	4.27	0	4.18	5.2	0	4.7	4.20	4.29	4.20	4.29	5.7				4.28	5.5	0
Spy (N.)										4.23	4.28	5.3							5.6	5.12	0
Salome				4.25	4.27	0	4.24	5.4	0	4.9	4.18	4.28							4.28	5.5	0
*Scotts Winter	4.16	4.25	0	4.27	4.28	0	4.18	4.28	0	4.10	4.15	5.1	4.18	4.28	5.9				4.27	5.1	0
Summer Queen							4.27	5.1	0	4.15	4.18	5.6	4.28	5.9	5.18				5.1	5.6	0
Soulard (crab)				4.28	4.29	0	4.18	4.29	0	4.8	4.19	5.1	4.22	5.2	5.10				4.28	5.4	0
Stark	4.15	4.20	0				4.25	5.1	0	4.9	4.16	5.1	4.20	5.4	5.12				4.27	5.3	0
Taylor	4.25	5.7	0										4.16	4.24	5.2				5.3	5.9	0
Tetofsky							4.15	4.19	0				4.16	4.23	5.11				4.22	4.28	0
Tallman Sweet							4.22	5.3	0	4.16	5.1	5.9	4.18 5.4	5.3 5.14	5.12 5.20	4.28	5.7	5.17	4.30	5.5	0
Transcendent (crab)	4.16	4.23	0	4.15	4.20	0	4.13	4.24	9	4.4	4.15	4.23	4.16	4.26	5.4				4.21	4.27	0
Twenty Ounce	4.22	5.3	0	4.21	4.26	0	4.22	4.28	0	4.9	4.20	4.28	4.20	4.28	5.7				4.27	5.4	0
Transparent (Yellow)	4.20	5.3	0	4.18	4.21	0	4.19	5.2	0				4.6	4.16	4.25						
Willow													4.20	5.6	5.11				4.29	5.6	0
Wolf River				4.21	4.24	0	4.23	5.4	0				4.20	4.30	5.20						
Winesap							4.24	5.2	0	4.16	4.24	5.1	4.27	5.10	5.16						
White Belleflower							4.25	5.3	0				4.21	5.6	5.10				4.28	5.2	0
Willow Twig				4.29	5.3	0	4.25	5.5	0												
Whitney (crab)				4.17	4.20	0	4.16	4.29	0	4.6	4.15	4.28	4.19	4.26	5.3						
Walbridge							4.18	5.6	0	4.14	4.20	4.29	4.22	5.2	5.17						
Waxen	4.12	4.19	0	4.24	4.29	0													4.27	5.4	0
White Pippin				4.22	4.26	0	4.16	5.4	0	4.8	4.21	4.30	4.16	5.4	5.10				4.24	5.1	0
Wealthy	4.26	5.7	0				4.22	5.5	0	4.3	4.20	5.6	5.1	5.9							
Western Beauty	4.26	5.3	0	4.27	4.29	0	4.22	5.3	0	4.15	4.23	5.1	4.22	5.3	5.10				4.28	5.3	0
Wagner							4.27	5.5	0	4.13	4.22	5.3	4.22	5.10	5.16				4.28	5.4	0
York Imperial	5.4	5.11	0	4.23	4.26	0	4.25	5.7	0	4.15	4.24	5.2	4.22	5.6	5.16				4.30	5.8	0

*A, B, and C stand for first blossoms, full blossom, and full of blossoms, respectively.
†The dates read for example: 4.25, April 25; 5.7, May 7; 0, no record kept.

TILLAGE.

Modern soil tillage has in view two chief ends, namely, to improve the mechanical condition, and to increase chemical and biological activities or changes. In the growing of shallow rooted crops, tillage aims to serve both purposes equally, but in the growth of the orchard crop the chief aim is the latter purpose, that is, to induce vigorous chemical and biological changes. The roots of the orchard crop feed so deeply in the soil that tillage operations cannot be expected to greatly modify the physical conditions, except upon the surface. This is one of the leading reasons why a deep, porous, well drained soil primarily should be selected for an orchard site. Plowing, subsoiling, harrowing, and cultivating break up the soil to a depth suitable for the root systems of the cereal, root and forage crops, but such operations only serve to help the orchard crop for the first few years of its growth. By the time the tree comes into bearing its principal roots should be feeding in the soil far beneath the reach of the plow and cultivator, and besides havoc would be wrought if tillage tools were to reach among the roots for the purpose of putting the soil in better physical condition. This phase of the subject need receive no further consideration here save this observation: The importance of the first preparation of the soil for the reception of the trees is not to be underrated. Deep, thorough tillage of a well broken and subdued soil is an essential to success in the first steps of orcharding. When the young tree is transplanted it undergoes a severe check to its vegetative functionings. Too much cannot be done by way of putting the soil in a fit condition to favor rapid and unobstructed root growth. A point always to be kept in mind when one is dealing with the problems of tree life is that a living, working tree requires a more or less definite amount of energy to produce new wood and leaf growth and a crop of fruit. Any object that obstructs in any way the freedom of growth, or checks the supply of available food materials reduces the tree's supply of energy, and thus retards its growth or croppage. Clods, rocks, puddled earth particles, coarse vegetable matter and other materials may offer obstructions to the course of growth of the roots, or render the food supply more difficult to obtain; all these conditions are hindrances to the plant's best development. So much of the plant's energy, best efforts, vigor, is used in overcoming these obstacles that frequently the young tree fails to survive the shock of being transplanted. Every time a young root turns out of a quite direct course in its growth there is lost plant effort; every time an absorbing rootlet is obliged to encompass a clod instead of penetrating between fine particles, more plant energy is wasted; every time the roots of plants are surrounded with clods, lumps, and soil masses so large that the water of the soil cannot be conserved against evaporation during periods of dry, warm weather, the root system receives a check which too often results, disastrously to the young tree; if there is too much half-rotted vegetable matter in the soil when the young roots begin to push out the heat of this during the process of further decay may rise so high as to kill the tender young roots; or, it may drive off the soil water to such an extent that not enough remains to make the mineral plant food of the soil available. For the use of most plants mineral substances must be in very weak solutions, as one part of mineral matter to 10,000 parts of water, or even as weak as one in 15,000 parts of water.

All these conditions, so unfavorable to tree growth, are eliminated by such thorough tillage as should be given the soil for at least one year, and preferably two or three years preparatory to the planting out of the young trees.

A thoroughly subdued, deep, fertile, friable soil worked fine is an ideal place in which to transplant a young tree, and under such conditions there is little danger of it not enduring the change.

Tillage, for the purpose of inducing chemical and biological changes in the soil, is all-important to the orchardist, or other soil tiller for that matter. It has been long known to students of soils that there are two classes of changes constantly going on in ordinary agricultural soils independent of tillage operations, but both of which may be greatly augmented by judicious tillage. Chemical changes in the soil result more or less directly in the release of mineral substances needed by the plant. These changes are hastened and increased by the presence in the soil of water, heat, and air in sufficient quantities, and by the stirring and consequent changing of position of the soil particles. These requirements, or rather desirable conditions, are fully induced by proper tillage operations. By pulverizing the soil, air is admitted; this warms the soil; the water of the soil during the dryer part of the season, by this same operation, is kept from passing off in the form of vapor as readily as it otherwise would, and while the position of the soil particles is greatly changed, their size is also reduced.

The biological changes taking place in the soil and which are likewise greatly facilitated by good tillage, are various and quite imperfectly understood. A few of the more important ones like nitrification, have received much attention in recent years and results of much moment to the soil tiller are being reached through the biological investigations of the soil now being carried on in nearly every scientific center.

CULTIVATION.

Tillage operations generally discussed as cultivation are as variable as the individuals that are engaged in orcharding. Some rely chiefly upon the old-time plow, but more count the modern disc-harrow the staple tool. These latter followed by clod-crushers, acme harrows, and scarifiers do most effective work under the usual soil conditions to be found in Oregon orchards.

One plowing in alternate years is held to be sufficient for all the mellow soils, though some find that disking alone is all-sufficient. Upon the clayey soils most cultivators deem one plowing a year desirable and in this practice the two operations of contiguous years are at right angles, *i. e.*, one year plow east and west; next year, north and south. Plowing or disking are usually followed by clod crusher or pulverizing harrow. The first operation is usually just after the blossoms fall. Then at intervals of two or three weeks the pulverizing harrow follows until the middle of July or first of August. By this time or even by the middle of June, the surface soil from two to three inches deep is a perfect dust, the so-called "dust mulch" or "earth blanket"—a most important factor in the conservation of soil moisture. Where ferns or some other deep-rooted perennial plants persist in playing the part of weeds it is often necessary to go over the ground at intervals of ten days with a tool known as a scarifier. By removing the tops at frequent intervals the roots finally become exhausted, and as there is left no other means for the plant to propagate itself it disappears. It frequently requires from three to four years to rid a piece of land of a well established crop of ferns. Occasionally one hears that trees should not be planted on a fern ridge because the plant is such a pest in the orchard. In truth fern ridges when once subdued are the very best of sites for orchard purposes. Ferns only grow abundantly on well drained soil. The ramifications of their underground stems and the ultimate death and decay of these very materially aid in oxidizing and aerating the soil, to the depth of two feet, or even

more. This oxidization and aeration are highly important processes in the biological functionings of the soil, and most useful factors in rendering the plant food of the soil available for tree growth.

COVER CROPS.

This is a phase of orchard management that has received little attention as yet. Speaking more particularly of Western Oregon it may be said: Thus far our orchards that are thoroughly tilled have shown no especial need of service in the directions in which a cover crop would aid them, but the time is approaching when such conditions will no longer exist. Thorough tillage increases oxidization in the soil. The humus burns away, as it were, and need for material to replace the original supply will be manifest, in a dryer, harsher soil, sometimes heavier, sometimes lighter; in a soil that will be cloddy and intractable, generally throughout Western Oregon. This material can be obtained at least expense by means of cover crops, as oats, wheat, rye, vetch, clover, mustard, and the like.

As to the functions of a cover crop altogether, it may be well to quote from bulletin No. 61, of the Delaware station, which says:

"WHAT DOES A COVER CROP DO?

1. If sown at the proper time, about August 1st if weather conditions are favorable, it competes with the trees for soil moisture and plant food. The supply of moisture and food to the trees is lessened and their growth is checked. This is desirable, because at that time the trees should stop growing and ripen their wood for the winter;*

2. It catches soluble nitrates late in the fall when root action of the trees has nearly or quite ceased, thus much plant food is saved rather than allowed to escape in drainage;

3. It prevents erosion of the surface soil by catching the rains as they descend and by conducting them into the soil. This is in contrast to streams of water flowing over the bare surface and cutting channels for the escape of surplus water. It also holds the snow of winter, which adds to the efficiency of the protection;

4. It protects the ground from frost to a certain extent; that is, actual tests have proven that ground protected by live cover crops during the winter does not freeze so deep as does bare ground;

5. In the spring it catches soluble nitrates that might leach out of the soil before active root action of the tree begins;

6. It pumps the surplus water out of the soil early in spring so that the ground warms up and may be plowed earlier than if no cover crop were used;

7. When plowed under, these crops add enormous amounts of vegetable matter or humus to the soil. The humus improves the mechanical condition of the ground by loosening up the soil particles; it increases the water-holding power of the soil, provides a favorable home for soil bacteria, furnishes elements of plant food in available form, and assists in breaking up chemical compounds of plant food which would otherwise remain unavailable;

8. Experience has shown that the continued use of cover crops will, to a certain extent, make heavy land lighter and light land heavier. This is an immense advantage in practical orchard operations."

Cover crops may be grouped into two—possibly three—classes; the leguminous, as peas, beans, alfalfa, clovers, vetches, cow peas, and the

*This statement applies more particularly to young trees. Bearing trees with us would need no such check and it would be well to sow the cover later, thus not shortening the supply of water for the fruit.

like; the potash gatherers, as turnips, rape, and probably kale, and the non-leguminous, as rye, wheat, oats, barley, mustard, buckwheat, rape, millet, corn, and others.

The first class are the so-called nitrogen gatherers, and may be considered as fertilizers as well as cover crops. One of the most important materials used in plant growth is nitrogen. This material bought as a commercial fertilizer or applied with barnyard compost is quite expensive. It abounds in the air as one of the principal gases and, so far as we know at present, this gas can be used directly only by leguminous plants. Or, in other words, this free nitrogen of the air, which is inexhaustible, is made available as plant food through the agency of leguminous plants, while other plants must get the nitrogen required for their growth from the supply in the soil or that set free by decomposing plants or animals. Then, since nitrogen is one of the most valuable of plant foods, it is evident that any plant which is able to get its supply of this element from the inexhaustible stock of the air must be doubly valuable as a cover crop.

By recent analyses* it is made evident that certain plants, cowhorn turnips and rape, are rich in potash. It thus appears that such crops used for cover purposes might put the potash supplies of the soil within easier reach of the tree. If the soil of an orchard is rich in humus and nitrogen, a cover crop of potash-gathering plants, if from such knowledge as we have of them, we may call them such, would be the logical one to use. In this connection it may be well to note the fact that Scotch kale, a plant closely related to the turnip, has been giving some remarkable yields in Western Oregon, as a forage plant for dairy purposes. It seems probable that this plant would do efficient service as a cover crop on soils in good tilth and well supplied with humus. And since potash tends to hasten the maturity of a crop, increase the sugar content, and heighten the color, indirectly, at least as a consequence of earlier maturity, its importance to the fruit grower in the moisture sections of our State becomes evident, and any secondary or catch crop that will render the potash of the soil more readily available for the trees is to be held as a useful factor in orcharding. But, as before stated, only practical tests upon the site will determine the course to be followed in each instance. The crops, rotation or tillage, will depend upon the local conditions and the successful orchardist will be the intelligent experimenter in these matters.

A rotation of cover crops is as important as a rotation of general farm crops. The constant use of a leguminous crop would tend to make the soil very rich in available nitrogenous materials. This would induce excessive wood and foliage growth at the expense of flowers and fruit. To offset this, cover crop as often as the trees appear to be growing too vigorously at the expense of fruit production.

Then we must not lose sight of the fact that though a cover crop may not of itself use the free nitrogen of the air, it will avail itself of such nitrogen material as is obtainable in the soil during its period of growth, and, as this is at a time when the dormant tree could make no use of such nitrogen material, which, if not used, soon escapes as a waste by leaching from the soil, it is seen that the cover crop thus becomes a saver of nitrogen as well as other substances and thus performs a work as important as that of a nitrogen gatherer under the circumstances.

In Western Oregon orchards in particular, not a foot of soil should remain uncovered or bare of plant growth from the time the crop is fully grown to the time when the fruit begins to form the following

*Delaware station.

spring. The warm winter temperature, together with the rainfall, results in a set of conditions quite suitable for the growth of many hardy plants. Under the same conditions biological and chemical changes in the soil are setting free much soluble plant food material. This material, if not used by active plants on the ground, will be wasted very largely by surface washing or leaching through the drainage system. An active crop saves this waste; puts it in such form as can be more readily used by the trees when they become active in the spring. And thus, while saving what would otherwise be lost to the soil tiller, the cover crop performs a preliminary or preparatory work for the trees, getting ready for their use early in the spring a quantity of predigested breakfast food, as it were. And, as with the human, the more substantial the breakfast the better the start in the season's work.

While the list of plants that may be grown for cover purposes is quite long, each locality and each grower will find that local conditions and personal requirements will render some more suitable than others for his purpose. So far as reports have been made the vetch—*Vicia sativa*—appears to give the best results in Western Oregon.

PRUNING.

"Pruning is commonly resorted to only for the purpose of increasing the vigor of feeble trees, or to regulate or improve the form of healthy and luxuriant trees."—*Downing.*

"The course to follow in pruning will depend upon which of the two leading objects, vigor of growth or fruitfulness, is in view. Pruning at one season will produce one result, while pruning at another will yield a different result, hence prune in winter for wood and summer for fruit."—*Warder.*

"Bad pruning of the apple is disposed to give an alternate production of fruit."—*Passy.*

Pruning and training should go hand in hand in orchard making. To prune is to remove surplus or undesirable wood; to train is to evolve an ideal or correct form as a result of the pruning, but it should be remembered that the form will vary not only with the several kinds of trees but also with the different varieties of the same kind, as is well illustrated, for example, by the Northern Spy and Grimes Golden. The pruner must have the ideal form in mind and then prune accordingly. A brief discussion of the philosophy of tree growth may serve to aid the beginner in getting a better idea of how to proceed in the work of pruning. In the first place it must be kept well in mind that the tree is a community organization. Each bud is measurably independent—it is an individual. Every individual is struggling to make the most of its opportunities. Every bud that is enabled to develop into a branch becomes an important factor in the plant's economy, and its importance will depend upon the magnitude of its growth, and this depends very largely upon position and period of formation. Every tree is endowed with an impulse to grow upward and outward. This impulse is governed very largely by the influences surrounding the tree as light, heat, moisture, wind, food supplies, and room. One of the chief influences determining the form of the top is light. Every bud, every shoot, every branch, for its best development, needs ample light, other conditions being favorable, that bud or branch that has the best light relation will make the best growth. The best light relation normally is to be found about the top and outside of the tree's head. As a result of this better light relation growth begins earlier in the spring and continues later in the fall. The terminal buds are the last to go into the resting stage; the lateral

ones, and especially those well in toward the center, start last and stop first. The growth impulse gradually weakens in these inner twigs and shoots and many of them yield to their fellow branches on the outside. This process even goes to such an extent that many buds upon the inner and lower branches fail to develop into shoots at all, and still further, the lower buds upon a thrifty growing outside shoot often remain dormant. Thus it is that, practically, only the later formed buds of a season are the ones that develop into new parts. Another of the active influences in the tree's growth is the water and mineral matter supplied by the roots. This supply as it is forced or drawn upward through the tissues of the stems and branches, endeavors to follow the lines of least resistance. Usually a straight line offers the best course; hence, we commonly see the erect, straight branches or shoots growing fastest, and we come to think of the chief growth of a tree as being upward and outward. If the tree is crowded by its fellows, its lateral light relations will be poor, and accordingly growth will be chiefly upward.

All this results in what amounts to being a struggle for existence. Every bud and branch is using its best effort to get the best light and food supply. Some must yield by either becoming dormant or dying after a brief existence. This is nature's way of pruning. We see splendid examples of the process in thickets of young firs, and in the dense tops of old maples or evergreens. The lessons that nature would have us learn from these examples are that pruning should be such as to remove those shoots which are not in position to do the best ultimate service; that the removal of some branches is necessary to the best development of others; that thinning of the wood growth is necesary because more buds are formed and more twigs are started than can find light and space for successful development; that the judicious removal of undesirable or poorly located shoots in their earliest stages of growth, is economy of labor and material (plant energy).

Hence, remove undesirable wood, as far as possible, while it is small. This does not imply that large branches may not be taken off whenever found to be undesirable, but it does imply that such removal means a greater loss of the plant's energy. This view of pruning and training calls for a full knowledge of the individual types of trees, their characteristic forms of growth, and a comprehensive understanding of the requirements of economic plant culture.

If a young apple tree has been received from the nursery as a "switch" or "stick" one year old, there will be little pruning to be done at the time of planting out, save cutting back the top to correspond with the loss of root system made necessary by removal from the nursery row, and the trimming of wounded roots. Should the tree to be planted be of two or more years, as is too frequently recommended by nurserymen and dealers, then the whole top should be removed to such an extent as will correspond with the amount of roots cut away.

The writer recommends only one-year-old trees for general transplanting. A one-year-old tree is small; it does not suffer so severe a check upon removal from the nursery as an older tree. Less cutting back, relatively, is necessary at setting out. The wounds made are smaller and accordingly heal over more readily, allowing less opportunity for attack by injurious fungi.

All operations save tillage are benefited by the formation of low heads. As the growers of Eastern Oregon remark: "We like to work on the ground floor, for it facilitates the work of picking and thinning": while in sections where heavy winds prevail much less loss of fruit occurs in orchards of low headed trees, and the trees themselves are of better form, thus requiring less attention and labor in pruning.

As to the manner in which the head may be formed there are several important points to keep in view. And first, perhaps as to whether a central leader shall be left, or all main branches trained to develop uniformly. The latter has been the common practice in later years.

Then, after this question of form is settled there comes the question of branches or laterals. Not more than four, and usually three, are quite enough for this purpose, especially if a central leader is left. Too many branches make a bushy close top, while too few would leave a top too open or ill-shapen. In cases without a central leader the buds which are to form the chief branches of the head should be left not closer than eight inches apart. When the tree has grown to full size there will then be no more open space between them than is necessary to maintain a good strong union, a point that is too often overlooked in the formation of the heads of all kinds of fruit trees.

When the few topmost buds of the young tree are left to form the head they are usually so close together that in a few years the forks of all are united and the result is a weakened union. There is not sufficient distance upon the main stem for the several branches, as they increase in size, to make a close union with it. At the end of the first season's growth the young branches that are destined to form the top should be cut back about one-half. From these stubs the next year two chief secondary branches should be allowed to form upon each. The following winter the young growth should again be cut back about one-half. The third and fourth years the tree should receive similar treatment. The fifth year, such branches as interlace should be removed; irregular, diseased, and malformed shoots should be cut back or taken out, as the case may demand. If the trees are planted upon deep, heavy, well-watered soil and continue to make excessive wood growth it may be necessary to give them a summer pruning, which operation tends to check wood growth and induce the formation of fruit buds. In the warmer, dryer sections, and where the soil contains considerable sand, trees will begin to bear at five years or even earlier, but in those sections where the climate is cool and moist and the soil heavy and deep, trees may show a disposition to devote all their effort to the production of wood until they are seven, eight, or even nine years old. In such cases the check given by summer pruning is often desirable, though it may be a question as to whether trees ought not to be allowed to make their full growth before being forced into fruit production. Still, there is an advantage in hastening the time at which the trees are brought into bearing, and, if not allowed to overbear the first years of fruiting, they may complete their full growth without disadvantage to size or vigor, though the final growth will be made more slowly than would be the case if the trees had not been hastened into bearing.

The need for future pruning of the orchard will be variable. Each variety has a characteristic habit of growth. The pruning necessary to make the growth conform to our chosen type will depend upon how far apart are the "type" and the "habit." If the grower at the outset has adopted the plan of studying the habits of the different varieties, and has pruned for the purpose of getting the best results with the natural form of the variety rather than for the purpose of making all the trees conform to a common artificial ideal, then the work of pruning will be greatly simplified and reduced. The cutting back of excessive growths; the cutting out of interlacing, crossing, chafing, rubbing, and diseased branches; and the shortening in, as an offset against winds, will be the chief points to keep in view in all subsequent pruning operations. In the past, too little attention has been given to the study

of the individual habits of growth. Pruning has been indiscriminate. Not principles, but practices have prevailed in the direction of the work, until we can find trees of Western Oregon cast in the same mould as those of California or Southern and Eastern Oregon. Pears, apples, plums, and cherries have been treated alike as to cutting back, form of head, and style of branching! The practice followed with a species in a particular section, giving good results, has often been heralded as the ideal form for all fruit trees in, at least, the same cultural zone.

That such a course is most ill-advised can be readily seen if one will but observe the trees growing in any well-kept home orchard, and it may be said just here that the beginner in this work of growing an orchard would be well repaid by making a study of some of the best kept local orchards. Nothing can give one so good an idea of the traits of character of the different fruit trees as a study of the real plants as they develop under the hand of a good orchardist.

Four-year-old Peach Trees, Creswell. Orchard of Mr. Shaefer.

PEACH GROWING IN WILLAMETTE VALLEY

By A. M. LaFollette, *Salem, Oregon. Read at the 1910 meeting of the Oregon State Horticultural Society, and printed in this report in response to frequent demands for information on peach growing in the Willamette Valley.*

I was requested by Mr. Atwell to tell the members of this society and people present at this annual meeting what I know about raising peaches in the Willamette Valley, the diseases of the peach in this section, their treatment, pruning and planting, mode of cultivation, varieties successfully grown and probable profit per acre.

I will first take up the diseases of the peach in the Willamette Valley. The curl leaf is one of the most dangerous and destructive diseases, in my judgment, known to the tree of this most delicious fruit. I contend that when once a tree is fully inoculated with this disease it never recovers fully from the attack. It may live for awhile, grow fairly well, and raise fruit, but in the end it will succumb to the effect of this deadly disease. I can tell by looking at a tree whether it has ever been affected with this destructive disease, I think, just as certain as a physician can tell whether a patient has consumption or tuberculosis germs in his system. The tree, as I have said, may partially recover from being affected with this disease but the leaves will never be large and symmetrical with a very dark green color and smooth and slick like they had been highly varnished; on the other hand, they will be only about two-thirds size, irregular, dull green color, and uneven. Now it is very easy to control this disease, as in my orchard I have complete control of it and this is why I have had success in raising peaches in the Willamette Valley. To control curl leaf I spray with a strong lime and sulphur solution from the first of December till the first of February, then following from the first of February till the fifth of March with a solution of four pounds of sulphate of copper and four pounds of lime to 45 gallons of water, giving the trees a thorough spraying with this and you would be astonished at the effect it will have on their growth through the summer.

There is another disease the growing peach is subject to, called the brown rot; a very destructive disease, attacking some of the peaches when only half grown and others when just ripening. Two or three peaches affected with this disease packed in a box of healthy ones will inoculate them all with this disease and ruin the whole box within 24 to 36 hours. Thorough spraying will control this dread disease. Any diseased or dried, mummified peaches left hanging on the trees should be immediately destroyed as the diseased spores dry and the wind spread them through the orchard. Some years ago I was troubled greatly with this disease, but now I seldom ever find a peach affected with it.

The California peach blight is also another disease that attacks the peach. It attacks the newly grown wood early in the fall or winter. It kills the leaf buds and turns the twig black, giving it a sooty appearance. I was also troubled with this disease in my peach orchard, but since I have adopted a thorough system of spraying it has disappeared altogether. I will add that the agricultural college is experimenting

at present in spraying for this disease on Mr. George Weeks' orchard, near Salem, which is very badly affected with it. This disease is the cause of so many peach trees being denuded of their foilage, only a few tufts of leaves growing at the ends of the limbs, caused, as I said before, by the leaf buds being killed along the new-grown wood.

Now in planting a peach orchard in the Willamette Valley, I plant my trees 20 feet apart each way, I plant one-year-old trees and cut them off, so they are four to eight inches high above the ground, I let only three or four buds grow the first year, rubbing the others off when about an inch long, spacing them evenly around the tree, and the first year's growth I cut back to six or eight inches. When the buds have grown on these limbs to about two inches in length I rub them all off excepting two buds on each branch, spacing them off so as to balance my tree as evenly as possible. This gives from six to eight limbs to start the future bearing tree from. About the first of August I pinch back the ends of the main limbs from three to four inches, thereby making the main limbs more stocky and stout, by stopping the growth in length and throwing it back into the side limbs and roots. The next spring after the buds start I prune out all surplus branches thoroughly, cutting the branches left to form the future tree back about one-third. The tree will now be making its third year's growth. Now I keep all water sprouts pulled off and, where the new growth is too dense, thinned out, as the perfect peach has to have plenty of sunlight and air. About the first of August I clip back all branches, cutting from three to five inches from the ends of this year's growth. By doing this I compel the tree to produce an enormous amount of fruit buds and where there are such a great amount of fruit buds there will be from 10 to 15 days' difference in the first blooms and last ones opening on the same tree, and it will be almost a miracle if the frost gets all the buds with 15 days' difference in the first and last buds blooming on a tree. With a peach tree pruned in summer, if one-tenth of the buds survive the winter you will have a full crop. If a peach blooms out and gets from five to eight days without a killing frost, nine times out of ten it is safe and immune from injury from any subsequent frost. When a peach is from the size of a currant to the size of a gooseberry it can freeze solid and will not be injured. In proof of this I will state that some years ago my peach trees bloomed early in February and when the peaches were about the size of a gooseberry there came a killing black frost and froze them till you could not cut them with a penknife. I went down in the orchard, examined the peaches, came back and told my wife we would have to do without peaches that year, but the freezing did not hurt them in the least and we had an extra fine crop of peaches that season. Now I think that by following the rules I have laid down you reduce the damage of frost almost to a minimum, and in proof of my theory I will cite you to the fact that I have failed to have a full crop only once in 29 years. Do you want any better proof?

Now as to the variety of peaches: In planting a peach orchard for commercial purposes I would not plant too many that ripen at the same time, but would plant desirable kinds and lengthen out the gathering season to about two or three months, for 20 or 30 acres of peaches ripening all at the same time requires an army of help to take care of them before they are too ripe to market. I have a three-year-old peach orchard in which I planted a great many different varieties so as to prolong the gathering season from the first of July till the middle of October, being three months and a half of continuous peach harvest, which I think is far better than to have a few varieties all ripening inside of 15 or 20 days. Come to my orchard any time from the first

of July till the middle of October and you will find me shipping peaches to market. To accomplish this I will name the varieties in their order of ripening, namely: Early Alexander, Amsden June, Waterloo, Triumph, Early Columbia, Hale's Early, Mamie Rose, Lovell, Champion, Early Crawford, Early Charlotte, Tuscan Cling, Golden Cling, Muir, Late Crawford, Elberta, Fitzgerald and Salway. Anyone planting these 17 varieties can have this luscious fruit continuously for at least three and a half months. As for the best canning and all-around peach I think the Elberta heads the list as the best freestone peach, and to prove this to you, I will state that at the National Horticultural meeting, held in St. Louis in 1905, according to statistics given there, three-fourths of all the peach trees planted in the United States were Elbertas, some of the eastern states planting them almost exclusively. It is one of the most vigorous growers, but the most susceptible to the curl leaf in this climate of any peach grown.

As for the cling peaches, I think the Tuscan is the best, being a very large peach with dark red cheeks and one of the hardiest peach trees grown and very little subject to that dread disease, curl leaf.

The Early Charlotte is a very fine freestone peach. The tree is very hardy and inclined to curl leaf but very little. It is a seedling from the Early Crawford and originated in Salem many years ago.

The Salway is as late a peach as I think advisable to plant in the Willamette Valley. It ripens from the first to the 20th of October. The Fitzgerald is a little later than the Salway and a very fine large peach.

As to the life of a peach orchard in the Willamette Valley that has been pruned and sprayed under scientific principles, I should think from 35 to 50 years would be no exaggeration. I have a lot of 21-year-old trees that bear every year and seem to be as healthy and vigorous as when they were 10 years old. I have some trees that are over 30 years old that are loaded with peaches every year. My son at Wheatland has a peach orchard in which some of the trees are 37 years old and they are loaded with fruit every year. This proves to me that a peach tree properly treated in the Willamette Valley will live at least a generation, but if not taken care of and treated with up-to-date methods they will succumb to the diseases they are subject to and die in a very short time. To grow a successful peach orchard in the Willamette Valley there are four fundamental rules to observe; the first and most important one is a thorough spraying at the right time and not too late; the next is a severe cutting back and pruning the first three years after planting so as to make the tree stocky and its roots strong and vigorous; the next is a thorough cultivation through the summer, keeping the moisture as near the surface as possible until the middle of September, and last, but not least, a thorough cutting back the ends of the branches about three inches from the first to the 20th of August, thereby insuring a profusion of fruit buds. Anyone having a good location, planting a peach orchard in the Willamette Valley, and observing these rules strictly will surely be successful. But if you do not observe them you will surely fail and had better keep the money in your pocket that you have to pay for trees.

The net income per acre from a peach orchard is a hard thing to figure on in advance. It depends a great deal on the age of the trees, how they have been cared for, cost of transportation and the scarcity in the markets. I think a fair average for five-year-old trees would be from eight to fifteen 20-pound boxes of peaches to the tree. It cost me a fraction over 14 cents per box to pack, wrap and box my crop the past season. I sold them at 65 cents f. o. b., leaving a net income of about 50 cents per box. Now I am not a stickler after locations or favored spots as some are, for the winds and storms have almost a mile's sweep

at my orchard from any direction and I have as good success as my neighbors whose orchards are well protected. I admit that an orchard not protected from the cold winds and storms will be more subject to curl leaf and other fungous diseases, but with thorough spraying and proper pruning of an orchard I think there is very little difference as to locations. What is most needed to grow a successful peach orchard is good rich land, well-drained, with the hardpan, if there is any, well broken up and where the water will not stand within three feet of the surface—thorough spraying, very heavy and judicious pruning, and thorough cultivation. With this I think it possible to raise a successful peach orchard in the Willamette Valley and as fine fruit as can be grown anywhere in Oregon and I think that anyone who saw my peach exhibit at the Oregon State Fair last September will agree with me in this assertion.

In conclusion, I will add that the people of the Willamette Valley are beginning to realize that they are on the map of the peach-growing districts of Oregon. I know there are some here who will take issue with me as to the Willamette Valley ever becoming a noted peach-growing district, but if they are "from Missouri" we propose to show them. Why, this season, within a radius of three miles from my farm, there were over 20,000 boxes of peaches raised, mostly from young trees. There is now, adjoining my place, 360 acres of young peach trees set out in one tract and this is only one hour and twenty minutes' travel from this beautiful city by electric line.

Now this may be news to many of you, living right here in Portland, but I assure you it is not to that great empire builder, James J. Hill, who has done so much for the Pacific Northwest and at present is doing for the great Willamette Valley and all Oregon. I say, it is not news to Mr. Hill, for did I not show John F. Stevens, his master builder and engineer, through these orchards and rich lands? Mr. Stevens said to me: "This is one of the richest and most ideal sections of land for fruit I have ever seen." And ever since Mr. Stevens' visit to our section of the Willamette Valley, when I hear the shrill toot of the electric train every hour in the day, it seems to me they say, "Ye tillers of the soil get a move on you, for we are over anxious for the time to come when we will be called upon by you to transport a trainload of your matchless fruits to the markets of the world every day."

HORTICULTURAL SOCIETIES IN OREGON.

Oregon State Horticultural Society—President, H. C. Atwell, Forest Grove; Secretary, F. W. Power, Lumbermen's Building, Portland.

Clackamas County Horticultural Society—A. J. Lewis, Oregon City, president.

Clatsop County Horticultural Society—J. Q. A. Bowlby, Astoria, president; Frank J. Taylor, Astoria, secretary.

Hood River Apple Growers' Fellowship—C. D. Thompson, Hood River, president; A. W. Peters, Hood River, secretary.

Upper Hood River Valley Progressive Association—Charles Goldsbury, Hood River, president; Charles Moody, Parkdale, secretary.

Lane County Horticultural Society—H. C. Bushnell, Junction City, president; Frank Needham, Eugene, secretary.

Marion County Horticultural Society—C. J. Kurtz, Salem, president; E. C. Armstrong, Salem, secretary.

Stanfield Fruit Growers' Association, Stanfield.

Walnut Club, McMinnville—W. C. Hagerty, McMinnville, president; W. H. Latourette, McMinnville, secretary.

Mosier Horticultural Society—Amos Root, Mosier, president; A. P. Bateham, Mosier, secretary.

FRUIT GROWERS' ASSOCIATIONS AND UNIONS IN OREGON.

Oregon City Fruit and Produce Growers' Union—George Waldron, Oregon City, president; M. J. Lazelle, Oregon City, secretary.

Mt. Hood Fruit Growers' Association————Cooper, Cherryville, president; E. D. Hart, Sandy, secretary.

Estacada Fruit Growers' Association—W. R. Stokes, Estacada, president; A. O. Whitcomb, Estacada, secretary.

Strawberry Growers' Association, Canby.

Yankton Fruit Growers' Association—A. J. Tarbell, Yankton, president.

Douglas County Fruit Union—W. J. Harris, Roseburg, president; L. B. Skinner, Roseburg, secretary.

Umpqua Valley Fruit Association—C. I. Leavengood, Myrtle Creek, president; C. H. Arundel, Myrtle Creek, secretary.

Riddle Fruit Growers' Association, Riddle.

Hood River Apple Growers' Union—G. A. McCurdy, Hood River, president; C. H. Sproat, Hood River, secretary.

Rogue River Fruit Association—C. W. Wilmeroth, Medford, manager.

Grants Pass Branch Rogue River Fruit Association—W. E. Woods, Grants Pass, secretary; F. Eisman, manager.

Coquille Valley Fruit Growers' Association—T. M. Hermann, Myrtle Point, president; G. G. Swan, Myrtle Point, secretary.

Coos Bay Fruit Growers' Association—P. M. Hall-Lewis, Marshfield, president; V. Henderson, Marshfield, secretary.

Eugene Fruit Growers' Association—H. F. McCornack, Eugene, president; J. O. Holt, Eugene, secretary and manager.

Siuslaw Fruit and Produce Association—R. W. Johnson, Florence, president; J. T. Miller, Florence, secretary and manager.

Albany Fruit Growers' Union, Albany.

Salem Fruit Union—C. L. McNary, Salem, president; E. C. Armstrong, Salem, secretary.

Southern Oregon Bartlett Pear Orchard.

Willamette Prune Association—W. J. Crawford, president; H. S. Gile, Salem, secretary and manager.

Butte Falls Prune Association—E. W. Coulson, Scotts Mills, secretary.

Lincoln County Fruit Growers' Union, Toledo.

Milton Fruit Growers' Union—E. P. Jensen, Freewater, president; August Tanke, Freewater, secretary; H. D. Lamb, Freewater, manager.

Grand Ronde Valley Fruit Growers' Union, La Grande.

The Dalles Fruit Growers' Association—Dr. G. E. Sanders, The Dalles, president; J. W. Merrill, The Dalles, secretary; J. W. Patterson, The Dalles, manager.

Dufur Valley Fruit Growers' Union—C. P. Balch, Dufur, president; P. W. Knowles, Dufur, secretary and manager.

Mosier Fruit Growers' Association—Amos Root, Mosier, president; J. M. Carroll, Mosier, secretary; H. M. Huxley, Mosier, manager.

Washington County Fruit Growers' Association—Ferd Groner, Hillsboro, president; B. N. Sproat, Reedville, secretary.

Newberg Apple Growers' Union—J. D. Gordon, Newberg, president; ———— Keim, Newberg, secretary.

Hylands Fruit Growers' Association, Sheridan.

McMinnville Fruit Growers' Association—D. C. VanDorn, Dayton, president; J. G. Eckman, McMinnville, secretary.

FRUIT AND VEGETABLE CANNERIES IN OREGON.

Ashland Preserving Co., Ashland.
Arcadia Canning Co., Arcadia.
Brownsville Canning and Preserving Co., Brownsville.
Canby Canning Co., Canby.
Corvallis Cannery Association, Corvallis.
Eugene Fruit Growers' Association, Eugene.
Weber-Bussell Canning Co., Freewater.
Independence Cannery Association, Independence.
Waters' Cannery, Lebanon.
Monmouth Evaporating and Canning Co., Monmouth.
Monroe Cannery Association, Monroe.
Myrtle Fruit Packing Co., Myrtle Creek.
Weber-Bussell Canning Co., Newberg.
Holmes Canning Co., Portland.
Oregon Packing Co., Portland.
Erie & Parker, Portland.
Pacific Coast Syrup Co., Portland.
Mutual Canning Co., Salem.
Springbrook Canning and Preserving Co., Springbrook.
The Dalles Cannery Co., The Dalles.
Seuffert Cannery, The Dalles.
Woodburn Canning Association, Woodburn.
Southern Oregon Canning Co., Yoncalla.

HORTICULTURAL LAWS OF OREGON

(*From Lord's Oregon Laws.*)

THE STATE BOARD OF HORTICULTURE.

§ 5470. *Board of Horticulture Constituted.*

There is hereby created a board of horticulture, to consist of six members, who shall be appointed by a board, consisting of the Governor, Secretary of State, and State Treasurer. One member of the said board of horticulture shall represent the State at large and shall be the president and executive officer of the board, and one member shall be appointed to represent each of the five districts as hereby created, to wit: (1) The first district, which shall comprise the counties of Multnomah, Clackamas, Yamhill, Washington, Columbia, Clatsop, and Tillamook; (2) the second district, which shall comprise the counties of Marion, Polk, Benton, Lincoln, Linn, and Lane; (3) the third district, which shall comprise the counties of Douglas, Jackson, Klamath, Josephine, Coos, Curry, and Lake; (4) the fourth district, which shall comprise the counties of Wasco, Sherman, Morrow, Gilliam, and Crook; (5) the fifth district, which shall comprise the counties of Umatilla, Union, Wallowa, Baker, Malheur, Harney, and Grant. [L. 1889, p. 126, §1; L. 1891, p. 174, § 1; L. 1895, p. 33, § 1; L. 1899, p. 55, § 1; B. & C. § 4176.]

§ 5471. *Residence of Members—Terms of Office—Duties of President.*

The members shall reside in the districts for which they are respectively appointed. They shall be selected with reference to their knowledge of and practical experience in horticulture and the industries connected therewith, and shall be engaged in practical horticulture during their incumbency of the office of commissioner. They shall hold office for the term of four years, and until their successors are appointed and have qualified unless removed by the appointing board for failure to perform their duties. It shall be the duty of the president to visit, at least once a year, every district, and examine the orchards, nurseries, and work of the district commissioners, and ascertain whether or not the law and regulations of the board are being properly executed. He must personally inspect most of the orchards during the fruit growing season, see that the regulations of the board regarding spraying are being faithfully executed wherever insects, pests, or disease injurious to tree or fruit are to be found. He must visit the principal fruit shipping points during the shipping season, inspect the fruit shipped, and prevent the shipment of insect and pest-infested fruit. He shall give notice through the public press one week in advance of his visit to each county, giving the time and place of his visit, where he shall receive complaints of fruit growers and distribute to them printed and oral instructions regarding destruction of pests and other information, including proper methods of handling, packing, and shipping fruits. It shall also be his duty to visit, when possible, if requested by an association or a number of fruit growers, the meetings of such associations

of fruit growers, and aid them in the organization of proper associations beneficial to the growing and marketing of fruits. The president shall preside at all the meetings of the board, and may call special meetings whenever an emergency may require it. He shall make an annual report to the appointing board of the general condition of the fruit interests of the State and success of the commissioners in the work of exterminating pests and executing the law. [L. 1889, p. 126, § 2; L. 1895, p. 34, § 2; L. 1899, p. 56,§ 2; B. & C. § 4177.]

§ 5472. *Secretary of Board, His Salary—Treasurer—Oath of Members.*

Said board shall employ without their number a secretary, who shall exercise the powers and discharge the duties conferred upon him by this act, and whose compensation shall not exceed $100 per month, to be paid in the same manner as other state officers. Said board shall also elect from their own number a treasurer. Before entering upon the discharge of his duties, each member of the board shall make and subscribe an oath to support the constitution of the United States and of the State of Oregon, and to diligently, faithfully, and impartially discharge the duties of his office, which said oaths shall be filed with the secretary. The secretary shall make and subscribe a like oath, which shall be filed with the treasurer of the board. [L. 1899, p. 127, § 3; L. 1895, p. 34, § 3; B. & C. § 4178; L. 1905, c. 222, p. 385, § 6.]

§ 5473. *Each Member May Appoint Deputies—Their Authority.*

Each member of the State Board of Horticulture shall have authority to appoint, whenever it shall seem to him expedient, a special deputy or deputies, who shall be empowered to discharge any and all the duties prescribed for the members of said board in section 5487, but the work and authority of said deputies shall be confined to the districts of the commissioners by whom they are respectively appointed. [L. 1903, p. 251, § 1.]

§ 5474. *Compensation of Deputies.*

Any deputy appointed under the authority conferred by this act shall receive as compensation for his services $2.00 per day for each day actually spent in the performance of his duties as such deputy, and all claims for compensation of such deputies shall be audited and paid in the same manner as claims of members of the Board of Horticulture. [L. 1903, p. 251, § 2.]

§ 5475. *Expense, How Paid.*

Any expense incurred under the provisions of section 5474 of this act shall be paid out of the appropriation allowed to the State Board of Horticulture. [L. 1903, p. 251, § 3.]

§ 5476. *Board May Receive Donations, Etc., and Select Lecturers, Meetings of.*

The board may receive, manage, use, and hold donations and bequests of money and property for promoting the objects of its formation. It shall meet on the second Monday of April and October in each year, and as much oftener as it may deem expedient, for consultation on and for the adoption of those measures that will best promote the horticultural industries of the State. It may, but without expense to the State, select and appoint competent and qualified persons to lecture in each of the districts named in section 5470, for the purpose of encouraging and improving practical horticulture, and of imparting instruction in the best methods of treating the diseases of fruits and fruit

trees, cleansing orchards, and exterminating orchard pests. [L. 1889, p. 127, § 4; B. & C. § 4179.]

§ 5477. *Office of Board, Where Held, When Open.*

The office of the board shall be located at such a place as a majority thereof may determine. It shall be kept open to the public, subject to the rules of the board, every day excepting Sunday and legal holidays, and shall be in charge of the secretary during the absence of the board. [L. 1889, p. 127, § 5; B. & C. § 4180.]

§ 5478. *Board May Make Quarantine Regulations—Violation a Misdemeanor.*

For the purpose of preventing the introduction into the State or spread of contagious diseases, insects, pests, or fungous growths among fruit or fruit trees, and for the prevention, treatment, cure, and extirpation of fruit pests, and diseases of fruit and fruit trees, and for the disinfection of grafts, scions, orchard debris, fruit boxes and packages, and other material or transportable articles dangerous to orchards, fruit or fruit trees; said board may make regulations for the quarantining, inspection, and disinfection thereof, which said regulations shall be circulated by the board in printed form among the fruit growers and fruit dealers of the State; shall be published at least four successive times in some daily or weekly paper in each county in the State before the same shall be in force therein, and shall be posted in three conspicuous places in each county in the State, one of which shall be at the county court house. Such regulations, when so promulgated, shall be held to import notice of their contents to all persons within the State, and shall be binding upon all persons therein. A willful violation of any quarantine or other regulation of said board, necessary to prevent the introduction into the State, or the shipment, sale, or distribution of any articles so infected as to be dangerous to the fruit growing interest of the State, or the spread of dangerous diseases among fruit trees or orchards, shall be deemed a misdemeanor, and on conviction thereof, shall be punished by a fine of not less than $5.00 nor more than $100 for each offense, or by fine and imprisonment not less than five nor more than thirty days. [L. 1889, p. 127, § 6; L. 1891, p. 175, § 6; L. 1895, p. 34, § 4; B. & C. § 4181.]

§ 5479. *Members to Visit Districts, Inspect and Quarantine Orchards.*

It shall be the duty of the several members of the board, and of the secretary under their direction, to visit their respective districts, and to see that all regulations of the board and all provisions of law to prevent the introduction or spread of fruit pests and diseases of trees or plants injurious to the horticultural interests of the State are enforced. Any member of the board, or the secretary thereof, shall forthwith, upon the complaint of interested parties, inspect orchards, nurseries, and other places suspected to be infested with fruit pests or infected with contagious diseases injurious to trees, plants or fruits. If, upon report of any member or the secretary, the board shall be of opinion that any locality, district, orchard, or place is infested with fruit pests or infected with contagious diseases, or injurious to trees, plants, or fruits, and liable to spread to other orchards or localities to their damage or injury so as to be a public danger, said board shall, by an order entered upon its minutes, declare such place to be under quarantine, and shall give notice thereof by posting a notice in writing in a conspicuous place upon the premises, specifying with convenient certainty what place or premises are under quarantine regulations, and by delivering a copy

of such notice to the owner or person in charge of the premises, if he may be found thereon; and such place shall thereafter be subject to quarantine regulations of the board, and violation thereof shall be punishable as hereinbefore provided. As soon as, in the opinion of any member of the board, or the secretary thereof, the danger from such quarantine locality shall have ceased, he may suspend the said quarantine, and shall immediately report the fact to the board, who may confirm such action or may re-establish the said quarantine, in which case it shall not be again suspended but by action of the board. [L. 1889, p. 128, § 7; L. 1895, p. 35, § 5; B. & C. § 4182.]

§ 5480. *May Appoint Quarantine Guardians, Fix Salaries, Report Violations of Law.*

The board, and, in case of necessity during the recess of the board, the member residing in the quarantined district, or the secretary may appoint such quarantine guardians as may be needed to carry out the provisions of this act, whose duty it shall be to see that the regulations of the board and the instructions of the secretary are enforced and carried out. They shall also report to the board all infractions or violations of said regulations or of the law in regard to quarantining, disinfection, and destruction of pests. The salary of quarantine guardians shall be fixed by the board at not to exceed $2.00 per day, and shall be paid by the owners of orchards or other places under quarantine, and they may maintain an action therefor before any justice of the peace in any district in which any quarantined locality is wholly or in part located; but in no case shall they have any claim upon the State for such services. [L. 1889, p. 128, § 8; L. 1891, p. 176, § 2; L. 1895, p. 36, § 6; B. & C. § 4183.]

§ 5481. *Authority Conferred in Last Two Sections, Exercised in Emergencies.*

The powers conferred in the two preceding sections of this act shall be exercised only in great and imminent danger to the fruit interests of the State, and with the utmost caution and regard for the rights of individuals affected, consistent with the safety and welfare of the fruit interest of the whole State. [L. 1895, p. 36, § 7; B. & C. § 4184.]

§ 5482. *County Inspector, When County Court May Appoint—Qualifications.*

Upon a petition of not less than twenty-five residents and fruit growers of any county in this State, the county court of said county shall appoint a county inspector, whose duty it shall be to inspect the apple and other fruit orchards of said county, and to enforce the laws now in force and that may be hereafter in force in this State, applicable to the fruit industry and to the growing, handling, and selling of fruit, fruit trees, and other nursery stock; *provided*, that the inspector so to be appointed shall be recommended and certified to be competent for such position by the State district commissioner of the State Board of Horticulture for the said county, and said county inspector shall hold his office during the pleasure of said county court. [L. 1905, c. 222, p. 383, § 1.]

§ 5483. *District Commissioners to Instruct and Supervise County Inspectors.*

It shall be the duty of the State district commissioner to instruct and educate the county inspectors as to the laws and quarantine regulations of this State, and the rules and regulations of the State Board

of Horticulture. The county inspector shall perform his duties under the general supervision of the State district commissioner for said county, to whom he shall make reports in the manner prescribed by the State Board of Horticulture. [L. 1905, c. 222, p. 384, § 2.]

§ 5484. *Compensation of County Inspector, Report of Time and Expenses.*

Such county inspector shall be paid for his services, by the said county, a sum not exceeding $3.00 per day, and shall be reimbursed for his actual each outlay for team hire and railway fares for each and every day actually employed in the performance of his duties as herein provided, and the said county inspector shall report monthly to the said State district commissioner the time for which he is entitled to pay during the month next preceding, and also a statement of his own personal expenses while engaged in the performance of his duty as such county inspector during said month, and shall also file vouchers showing expenditures for such personal expenses, and the said State district commissioner shall certify the same to the county court before such compensation and personal expenses shall be paid to said county inspector. [L. 1905, c. 222, p. 384, § 3; L. 1907, c. 58, p. 109, § 3.]

§ 5485. *Inspector of Adjacent County May Perform Duties When County Fails to Appoint.*

If any county for any reason fails to appoint a county inspector as herein provided, then the inspector of any adjacent county may perform such services, and his compensation and the necessary expenses incurred in the performance of his duty shall be charged against the county where the service is performed, as if he had been appointed by the county court of said county. [L. 1905, c. 222, p. 384, § 4.]

§ 5486. *Appeals From County Inspectors to District Commissioner.*

The State district commissioner of horticulture shall hear and promptly decide all appeals from the county inspectors in his district, and his decision shall have full force and effect until set aside by the courts of the State. All appeals from county inspectors to the district commissioners shall be under the form and regulations as prescribed by the State Board of Horticulture. [L. 1905, c. 222, p. 384, § 5.]

§ 5487. *Infested Trees Nuisances—Proceedings Relating Thereto—Authority to Abate.*

It shall be the duty of the several members of the board and of the secretary or the county inspectors under their direction, whenever they shall deem it necessary to cause an inspection to be made of any orchards, nurseries, trees, plants, vegetables, vines, or any fruit packing house, storeroom, salesroom, or any other place within their district, and also of any fruit trees or nursery stock shipped from beyond the limits of this State, and if found infected with any pests, diseases or fungous growth injurious to fruits, plants, trees, vegetables, or vines, or with their eggs or larvae liable to spread to other places or localities, or of such nature as to be a public danger, they shall notify the owner or owners or persons in charge of or in possession of such articles, things or places, that the same are so infested, or in case such fruit trees or nursery stock, although apparently sound and not infested by any pest, shall have been from an infested district beyond the limits of this State, they shall also so notify the owner or owners or persons in charge of or in possession of the same, and shall require said persons to eradicate or destroy said insects or pests or their eggs or larvae, or

such imported fruit trees or nursery stock of infested districts without the limits of the State, or to treat such contagious diseases within a certain time to be specified in said notice. Said notice may be served upon the person or persons, or any of them, owning, having charge or having possession of such infested place, article, or thing, by any member of the board, or by the secretary thereof, or by any person deputed by said board for that purpose, or they may be served in the same manner as a summons in an action at law. Such notice shall contain directions for the application of some treatment approved by the commissioners for the eradication or destruction of said pests, or the eggs or larvae thereof, or the treatment of contagious diseases or fungous growths. Any and all such places, orchards, nurseries, trees, plants, shrubs, vegetables, vines, fruit, or articles thus infested are hereby declared to be a public nuisance; and whenever any such nuisance shall exist at any place in the State on the property of any owner or owners upon whom or upon the person in charge or possession of whose property notice has been served as aforesaid, and who shall have failed or refused to abate the same within the time specified in such notice, or in the property of any nonresident or any property not in the possession of any person and the owner or owners of which cannot be found by the resident members of the board or the secretary or county inspector after diligent search within the district, it shall be the duty of the board or the member thereof in whose district the nuisance shall exist, or the secretary or county inspector under his or their directions, to cause such nuisance to be at once abated by eradicating or destroying said insects or pests or their eggs or larvae, or by treating or disinfecting or destroying the infested or diseased articles, or imported fruit trees or nursery stock imported from an infested district without the limits of this State. The expense thereof shall be a county charge and the county court shall allow and pay the same out of the general fund of the county. Any and all sums so paid shall be and become a lien on the property and premises from which said nuisance shall have been removed or abated, in pursuance of this act, and may be recovered by a suit in equity against such property or premises, which suit to foreclose such liens shall be brought in the circuit court of the county where the premises are situate, by the district attorney in the name and for the benefit of the county making such payment or payments. The proceedings in such cases shall be governed by the same rules, as far as may be applicable, as suits to foreclose mechanics' liens, and the property shall be sold under the order of the court and the proceeds applied in like manner. The board is hereby invested with the power to cause such nuisances to be abated in a summary manner. [L. 1895, p. 37, § 8; B. & C. § 4186; L. 1907, c. 58, p. 110, § 2.]

§ 5488. *Duties of Secretary.*

It shall be the duty of the secretary to attend all meetings of the board, and to preserve records of the proceedings, correspondence, and actions of the board, to collect books, pamphlets, periodicals, and other documents containing valuable information relating to horticulture, and to preserve the same; to collect statistics and general information showing the actual condition and progress of horticulture in this State and elsewhere; to correspond with agricultural and horticultural societies, colleges, and schools of agriculture and horticulture, and such other persons and bodies as may be directed by the board, and prepare as required by the board reports for publication. [L. 1889, p. 129, § 9; L. 1895, p. 38, § 9; B. & C. § 4186.]

§ 5489. *Biennial Report—Compensation of Board Members.*

The board shall biennially, in the month of January, report to the legislative assembly a statement of its doings with a copy of the treasurer's reports for the two years preceding the session thereof. The members shall receive as compensation their actual expenses while engaged upon the work of the board or the enforcement of the provisions of this act, and shall be allowed $3.00 a day for the time actually employed. [L. 1889, p. 129, § 11; L. 1895, p. 38, § 11; B. & C. § 4187.]

§ 5490. *Duties of Treasurer.*

The treasurer shall receive all moneys belonging to the board, and pay out the same only for bills approved by it, and shall render annually to the board a statement in detail of all receipts and disbursements. [L. 1889, p. 129, § 12; L. 1895, p. 39, § 12; B. & C. § 4188.]

§ 5491. *Board to Report to Legislature.*

The said board shall report to the legislative assembly, commencing in January, 1891, what, if any, legislation is needed in aid of the horticultural and fruit growing interests of the State. [L. 1889, p. 130, § 14; B. & C. § 4189.]

§ 5495. *All Prunings and Cuttings Required to be Burned.*

It shall hereafter be unlawful for any person, firm, or corporation owning or operating any nursery, fruit orchard of any kind, hopyards, flower gardens, or ornamental trees to throw any cuttings or prunings from any fruit trees, nursery stock, ornamental trees, or hop vines into any public road, highway, lane, field, or other inclosure, or into any water course of any kind; but shall destroy such cuttings or prunings with fire within thirty days from the time such cuttings or prunings are made. [L. 1899, p. 97, § 1; B. & C. § 4190.]

§ 5496. *Owners of Nurseries, Etc., Required to Spray.*

It shall hereafter be the duty of any person, firm, or corporation owning or operating any such nursery, fruit orchard, hopyard, flower garden, or ornamental trees, and knowing such to be infected with any kind of insects, pests, or disease, to immediately spray or destroy the same in such manner as the fruit commissioner for his district may direct. [L. 1899, p. 97, § 2; B. & C. § 4191.]

§ 5497. *Certificate of Purity to go With Packages of Spraying Material.*

It shall be unlawful for any person, firm, or corporation doing business in the State of Oregon to sell paris green, arsenic, london purple, sulphur, or any spray material or compound for spraying purposes, in quantities exceeding one pound, without providing with each package sold a certificate, duly signed by the seller there of, guaranteeing the quality and per cent of purity of said materials. [L. 1899, p. 98, § 3; B. & C. § 4192.]

§ 5498. *Penalty Where Material Does Not Conform to Certificate.*

Any person, firm, or corporation selling any of the above materials which do not conform with the certificate furnished therewith shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be subject to a fine of not less than $25 nor more than $100. [L. 1899, p. 98, § 4; B. & C. § 4193.]

§ 5499. *Unlawful to Import or Sell Infested Fruit.*

It shall be unlawful for any person, firm, or corporation to import or sell any infested or diseased fruit of any kind in the State of Oregon. [L. 1899, p. 98, § 5; B. & C. § 4194.]

§ 5500. *Packing, Etc., or Delivering for Shipment Infected Fruit, Etc., a Misdemeanor.*

Every person who packs or prepares for shipment to any point within the State, or who delivers or causes to be delivered to any express agent or railroad agent, or other person, or to any transportation company or corporation, for shipment to any point without the State, any fruit or fruits, either fresh, cured or dried, that is infected with insect pests or diseases injurious to trees, shrubs, plants, fruits, or vegetables, is guilty of a misdemeanor. [L. 1899, p. 98, § 6; B. & C. § 4195.]

§ 5501. *Penalty for Violating Provisions of Act.*

Any person, firm, or corporation violating any of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not less than $25 nor more than $100. [L. 1899, p. 98, § 7; B. & C. § 4196.]

§ 5502. *Commissioner of Horticulture to Present Evidence, and District Attorney to Prosecute.*

It shall be the duty of the Commissioner of the State Board of Horticulture of the district in which a violation of this act occurs to present the evidence of the case to the district attorney, whose duty it shall be to prosecute any person guilty of a violation of this act, which prosecution may be brought in any of the justice courts of this State. [L. 1899, p. 98, § 8; B. & C. § 4197.]

(*d*) OF PACKING AND LABELING FRUIT AND NURSERY STOCK.

§ 5503. *Green Fruit Packed for Market to Be Labeled.*

Any person, firm, association or corporation engaged in growing, selling or packing green fruits of any kind within the State of Oregon, shall be required, upon packing any such fruit for market, whether intended for sale within or without the State of Oregon, to stamp, mark, or label plainly on the outside of every box or package of green fruit so packed, the name and postoffice address of the person, firm, association or corporation packing the same; *provided further,* that when the grower of such fruit be other than the packer of the same, the name and postoffice address of such grower shall also prominently appear upon such box or package as the grower of such fruit. [L. 1907, c. 11, p. 22, § 1.]

§ 5504. *False Representation as to Place of Raising or Packing Fruit Forbidden.*

It shall be unlawful for any dealer, commission merchant, shipper or vendor, by means of any false representations whatever, either verbal, printed or written, to represent or pretend that any fruits mentioned in section 5503, were raised, produced or packed by any person or corporation, or in any locality, other than by the person or corporation, or in the locality where the same were in fact raised, produced or packed, as the case may be. [L. 1907, c. 11, p. 22, § 2.]

§ 5505. *Possession of Fruit Falsely Labeled—Evidence.*

If any dealer, commission merchant, shipper, vendor or other person, shall have in his possession any of such fruits so falsely marked or

labeled contrary to the provisions of section 5503, the possession by such dealer, commission merchant, shipper, vendor, or other person, of any such fruits so falsely marked or labeled shall be *prima facie* evidence that such dealer, commission merchant, shipper, vendor, or other person, has so falsely marked or labeled such fruits. [L. 1907, c. 11, p. 22, § 3.]

§ 5506. *Penalty for Violation of Act.*

Any person violating any of the provisions of this act shall be deemed guilty of a misdemeanor and, upon conviction thereof, shall be punished by a fine of not less than $5.00, nor more than $500, or by imprisonment in the county jail not less than ten nor more than one hundred days, or by both such fine and imprisonment, at the discretion of the court. [L. 1907, c. 11, p. 22, § 4.]

§ 5507. *Liability for False Representation as to Variety of Nursery Stock.*

Any person selling nursery stock, or young trees, and representing the same to be of a variety different from what said nursery stock of trees actually are, shall be required to replace all such trees with stock of the same grade and variety as the original order and shall be required to make reasonable compensation to the purchaser for expenses and loss of time due to such error having been made. [L. 1907, c. 57, p. 109.]

QUARANTINE REGULATIONS.

At a special meeting of the Oregon State Board of Horticulture, held in Portland, April 2, 1895, all members present, the following regulations were adopted, in accordance with the laws regulating such matters, and are, therefore, binding upon all persons:

Rule 1.—All consignees, agents, or other persons, shall, within twenty-four hours, notify the quarantine officer of the State Board of Horticulture, or a duly commissioned quarantine guardian, of the arrival of any trees, plants, buds, or scions, at the quarantine station in the district of final destination.

Rule 2.—All trees, plants, cuttings, grafts, buds, or, scions imported or brought into the State from any foreign country or from any of the states or territories, are hereby required to be inspected upon arrival at the quarantine station in the district of final destination; and if such nursery stock, trees, plants, cuttings, grafts, buds, or scions are found to be free of insect pests and fungous diseases, the said quarantine officer or duly commissioned quarantine guardian shall issue a certificate to that effect; and, furthermore, if any of said trees, plants, cuttings, grafts, buds, or scions are found infected with insect pests, fungi, blight, or other diseases injurious to fruit or to fruit trees, or other trees or plants, they shall be disinfected and remain in quarantine until the quarantine officer of the State Board of Horticulture or the duly commissioned quarantine guardian can determine whether the said trees, plants, cuttings, grafts, buds, or scions are free from live, injurious insect pests or their eggs, larvæ or pupæ or fungous diseases before they can be offered for sale, gift, distribution, or transportation. All persons or companies are hereby prohibited from carrying any trees, plants, cuttings, grafts, buds, or scions from without the State to any point within the State beyond the nearest point on its line or course to the quarantine station in the district of ultimate destination; or from any point within

the State to any point therein, until such trees, plants, cuttings, grafts, buds, or scions have been duly inspected, and, if required, disinfected as hereinbefore provided; and all such shipments must be accompanied by the proper certificate of the inspecting officer; provided, however, that after such persons or company have given the proper officer four days' notice, he or they shall not be required to hold such shipments further, without the direction from such officer.

Rule 3.—All peach, nectarine, apricot, plum, or almond trees, and all other trees budded or grafted upon peach stocks or roots, all peach or other pits, and all peach, nectarine, apricot, plum, or almond cuttings, buds, or scions, raised or grown in a district where the "peach yellows" or the "peach rosette" are known to exist, are hereby prohibited from being imported into or planted or offered for sale, gift, or distribution within the State of Oregon.

Rule 4.—All trees, plants, cuttings, grafts, buds, scions, seeds, or pits arriving from any foreign country found infected with insect pests or their eggs, larvæ, or pupæ, or with fungi, or other disease or diseases hitherto unknown in this State, are hereby prohibited from landing.

Rule 5.—Fruit of any kind grown in any foreign country, or in any of the states or territories, found infected with any insect or insects, or with any fungi, blight or other disease or diseases injurious to fruit or fruit trees, or to other trees or plants, is hereby prohibited from being offered for sale, gift, or distribution within the State.

Rule 6.—Any boxes, packages, packing material, and the like, infected with insect or insects, or their eggs, larvæ or pupæ, or by any fungi, blight, or other disease or diseases known to be injurious to fruit or to fruit trees, or to other trees or plants, and liable to spread contagion, are hereby prohibited from being offered for sale, gift, distribution, or transportation until said material has been disinfected by dipping it in boiling water and allowing it to remain in said boiling water not less than two minutes; such boiling water used as such disinfectant to contain, in solution, one pound of concentrated potash to each and every ten gallons of water.

Rule 7.—All trees, plants, grafts, cuttings, buds, or scions may be disinfected by dipping in a solution of three-fourths of a pound of whale-oil soap (80 per cent) to each and every gallon of water; said whale-oil soap solution shall be kept at a temperature of 100 to 150 degrees. Said trees, plants, cuttings, grafts, buds, or scions shall remain in said solution not less than two minutes. After said trees, plants, cuttings, grafts, buds, or scions have been disinfected, they shall remain in quarantine fourteen days unless otherwise directed by the inspecting officer, for subsequent inspection, and if deemed necessary by the quarantine officer of the State Board of Horticulture, or a duly commissioned quarantine guardian, for further disinfection.

Rule 8.—All trees, plants, cuttings, grafts, buds, or scions may be disinfected by fumigation with hydrocyanic acid gas, as follows: Said trees, plants, cuttings, grafts, buds, or scions shall be covered with an air-tight tent or box, and for each and every 100 cubic feet of space therein one ounce of (C. P.) cyanide of potassium (98 per cent), one fluid ounce of sulphuric acid, and two fluid ounces of water shall be used. The cyanide of potassium shall be placed in an earthenware vessel, the water poured over the said cyanide of potassium, afterward adding the sulphuric acid, and the tent or box to be immediately closed tightly, and allowed to remain closed for not less than forty minutes. After said trees, plants, cuttings, grafts, or scions have been treated with hydrocyanic acid gas as above directed, they shall remain in quarantine for fourteen days, unless otherwise directed by the inspecting officer, for subsequent inspection, and if deemed necessary by a member of the State Board of Horticulture, or

the quarantine officer of said Board, or a duly commissioned quarantine guardian, for subsequent disinfection.

Rule 9.—All trees, plants, cuttings, grafts, buds, or scions imported or brought into the State shall be inspected upon arrival at the quarantine station in the district of final destination, and if found infected with any injurious insects or diseases which cannot be destroyed by the remedies required in rules 7 and 8 of these regulations, are hereby prohibited from being planted or offered for sale, gift, or distribution, and shall be proceeded against as a nuisance.

Rule 10.—If any person or persons having in their possession trees, plants, cuttings, grafts, buds, scions, seeds, or pits infected with an insect or insects, or with any fungi, blight, or other disease or diseases injurious to fruit trees, or to any other trees or plants, shall refuse or neglect to disinfect the said trees, plants, cuttings, grafts, buds, scions, seeds, or pits as is required by rules 7 and 8 of these regulations, after having been notified to do so by a member of the State Board of Horticulture, the quarantine officer of said Board, or a duly commissioned quarantine guardian, the said trees, plants, cuttings, grafts, buds, scions, seeds, or pits shall be declared a public nuisance, and shall be proceeded against as provided by law.

Rule 11.—Animals known as flying fox, Australian or English wild rabbits, or other animals or birds detrimental to fruit or fruit trees, plants, etc., are prohibited from being brought or landed in this State, and, if landed, shall be destroyed.

Rule 12.—Quarantine stations: For the first district, comprising the counties of Multnomah, Clackamas, Yamhill, Washington, Columbia, Clatsop and Tillamook, shall be Portland. W. K. Newell, quarantine officer, or any member of the Board or the secretary thereof. For the second district, comprising the counties of Marion, Polk, Benton, Linn, Lincoln and Lane, shall be Salem. L. T. Reynolds, quarantine officer, or any member of the Board or the secretary thereof. For the third district, comprising the counties of Josephine, Coos, Curry, Douglas, Jackson, Lake and Klamath, shall be Ashland. A. H. Carson, quarantine officer, or any member of the Board or the secretary thereof. For the fourth district, comprising the counties of Morrow, Wasco, Gilliam, Crook, and Sherman, shall be The Dalles. Emille Schanno, quarantine officer, or any member of the Board or the secretary thereof. For the fifth district, comprising the counties of Umatilla, Union, Baker, Wallowa, Malheur, Grant and Harney, shall be Milton and Pendleton. Judd Geer, quarantine officer, or any member of the Board or the secretary thereof. At all stations such other quarantine officers as may be from time to time appointed by the Board, notice whereof will be given, and complete lists of whom may be obtained from the secretary or any member of the Board.

Rule 13.—Importers or owners of nursery stock, trees or cuttings, grafts, buds, or scions, desiring to have such nursery stock, trees, plants, cuttings, grafts, buds, or scions inspected at points other than regular quarantine stations, may have such inspection done where required; provided, however, that such importers shall pay all charges of inspection; such charges and expenses to be paid before a certificate is granted. Transportation companies or persons and consignees or agents shall deliver and cause to be detained all nursery stock, trees, plants, and fruit at one or the other of the quarantine stations, for inspection, as provided by the rules and regulations of the Board.

Rule 14.—The fee for the inspection of apple, pear, plum, peach, nectarine, prune, cherry, apricot, nut-bearing trees and all other trees, shrubs or plants, shall be as follows: Thirty cents per hour, including the time from leaving home, inspection and return home of the inspector, and actual traveling and other expenses. On all fruits the fee for inspection

shall be $1 on any sum up to $35, and $2 on any sum over that amount, and $5 for carload lots.

Rule 15.—All persons growing nursery stock, trees, and plants for sale, or to be offered for sale, are hereby required to report to the commissioner of the district in which said nursery stock, trees, or plants are grown, for inspection during the months of September, October, or November of each and every year, and the commissioner of such district, or his duly appointed deputy, shall inspect such nursery stock, trees, or plants prior to shipment and delivery. When said nursery stock, trees or plants are found by said inspecting officer to be worthy of a certificate setting forth the freedom of such nursery stock, trees, or plants from live injurious insect pests, their eggs, larvæ, pupæ, or fungous disease the said inspecting officer shall then issue to the owner or owners of said nursery stock, trees, or plants, a certificate of inspection. The condition under which this certificate is granted is, that the party or parties receiving such certificate shall be compelled to disinfect by fumigation with hydrocyanic acid gas, as described in rule 8, all pear and apple trees, or other stock grown on apple roots, after lifting the same and before delivery to purchaser or carriers; and, in case such fumigation is neglected, said certificate of inspection shall be void and of no effect.

Passed at a meeting of the State Board of Horticulture at Portland, Oregon, April 3, 1895, and amended at a regular meeting of the State Board of Horticulture at Salem, Oregon, October 15, A. D. 1895.

At a regular meeting of the Oregon State Board of Horticulture, held October 14, 1907, Rule 8 of the Quarantine Regulations of the State Board of Horticulture was amended so as to read as follows:

All trees, plants, grafts, buds or scions grown in the State of Oregon and offered for sale within the State, and all such trees, plants, grafts, buds and scions grown out of the State of Oregon, and sold within the State for planting and propagation, shall be disinfected either with hydrocyanic acid as follows: Said trees, plants, cuttings, grafts, buds or scions shall be covered with an air-tight box or house, and for each and every 100 cubic feet of space therein one ounce of chemically pure cyanide of potassium (93 per cent), one fluid ounce of sulphuric acid and two ounces of water shall be used. The cyanide of potassium shall be placed in an earthenware vessel, the water poured over the said cyanide of potassium, afterward adding the sulphuric acid, when the box or house must be immediately closed tightly and allowed to remain closed for not less than forty minutes, or instead of such fumigation such trees, buds, or scions may be dipped in a standard solution of lime and sulphur of the strength required for winter use in spraying San Jose scale.

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